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## GLOBAL COORDINATION

As if IT project management weren't hard enough, cultural rifts, bungled translations and time differences are among the additional challenges that international project managers have to contend with. But effective communications, planning and homework can help project leaders smooth out a lot of these wrinkles. **PAGE 32**

## EXTREME DATA CENTER, EXTREME RELIABILITY

Visa's data center takes great precautions to keep the largest transaction engine in the world up and running, says Richard L. Knight, senior VP for operations. **PAGE 48**

OCTOBER 8, 2001

# COMPUTERWORLD THIS WEEK

## NEWS

6

**6 Users grumble** about Microsoft's client-access licensing for its high-end server software.

**7 Microsoft decides** to discontinue volume licensing of Windows NT Server 4.0, but it leaves questions about continued support unanswered.

**10 Competition** in the high-end Unix market heats up with IBM's launch of a 32-processor server.

**12 Problems with interoperability** and inventory management are preventing the Pentagon from keeping track of its chemical and biological warfare equipment.

**16 SunTrust Banks** anticipates quick payback from a help desk application that lets employees reset their own passwords over the Web.

**Quick Link**

For breaking news, updated hour daily at noon and 5 p.m., visit the Computerworld.com Web site: [www.computerworld.com/q7a1000](http://www.computerworld.com/q7a1000)

## BUSINESS

29

**29 Jon Auer** offers four scenarios that can help your organization who leasing IT equipment.

**30 E-learning** can help companies cut travel expenses and ensure more consistent training across regions, but beware: Licensing costs are on the rise, and senior management often views these electronic education tools as a replacement for face-to-face training.

**38 IT leadership** training programs, such as the intensive executive courses offered at Darden business school at the University of Virginia in Charlottesville, are helping to groom tomorrow's top technology managers.

**44 Workstyles:** IT professionals at ground zero in lower Manhattan have often had to work through brutal conditions to help deliver information and support to rescue and recovery workers.

## TECHNOLOGY

47

**47 Semantics** and ontology are very much on the mind of our philosophical columnist, Nicholas Petreley.

**54 Future Watch:** Eight IT watchers look ahead and tell us what we can expect to see and what they think researchers are neglecting.

**56 QuickStudy:** Microprocessors — chips made up of millions of transistors and other elements organized into specific functional operating units — are the topic of this week's tutorial.

**60 Security Journal:** Vince Tuesday finds that getting a new security position appointment is easy compared with wading through résumés and weeding out candidates.

**62 Emerging Companies:** Trigo's channel management software helps suppliers with catalog and order management in addition to connecting them to procurement exchanges.

## OPINIONS

24

**24 Maryfran Johnson** believes that IT must prepare to play a role in biometrics technology, given the heightened interest in security.

**24 Plimm Fox** writes that more IT organizations should embrace the role chief security and privacy officers can play in the wake of the Sept. 11 terrorist attacks.

**25 David Moschella** says IT can emerge with an improved image if it does the right things in the aftermath of the attacks.

**70 Frank Hayes** argues that IT should use its Y2K experience to lead the way in designing a command center to protect information infrastructures against disasters.

Editorial/Letters **24, 25**  
How to Contact CW **68**  
Company Index **68**  
Shark Tank **70**

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## ONLINE

### ATTACK AFTERMATH

For the latest Computerworld articles about the aftermath of the Sept. 11 terrorist attack, visit our special coverage page: [www.computerworld.com/q7a1030](http://www.computerworld.com/q7a1030)

### MCSE AT THE CROSSROADS

After anguishing over whether to update his MCSE certification for Windows 2000, community member Matt Pierce concludes that the benefits may not be worth the effort.

[www.computerworld.com/q7a1000](http://www.computerworld.com/q7a1000)

### HOW PREPARED IS IT FOR ATTACKS?

Read the testimony Richard D. Petthia, director of the CERT Coordination Center at the Software Engineering Institute of Carnegie Mellon University in Pittsburgh, gave before a House subcommittee.

[www.computerworld.com/security](http://www.computerworld.com/security)

### HANDLING LAYOFFS

Read "Downsizing Made Gentle" on page 42, then post your comments on how executives are handling laying off IT workers.

[www.computerworld.com/q7a1070](http://www.computerworld.com/q7a1070)

## AT DEADLINE

### Capital One Hires Bailor, Drops Co-CIOs

Capital One Financial Corp. named Douglas Bailor to become its CIO starting in February. Bailor is currently CIO at Washington-based National Stock Market Inc.

Morgan Connolly and Laura Ols have been co-CIOs at Capital One since early last year, but the Falls Church, Va.-based company said that wasn't meant to be permanent. It added that Ols will work for Bailor in IT, and Connolly will focus on business operations.

### Sun Plans Layoffs, Forecasts Q1 Loss

Sun Microsystems Inc. announced plans to lay off about 5,000 of its 45,200 employees by year's end, or about 10% of its worldwide. The company also said it will report a loss for its first quarter ended Sept. 30 on revenue of about \$2.6 billion, a sales loss that would be \$500 million less than Sun had expected.

### Microsoft Posts Excel, PowerPoint Patch

One day after Microsoft Corp. announced an initiative aimed at making it easier for users to protect their Windows systems (see story, page 8), the software vendor warned about a macro-related security vulnerability that affects Windows and Macintosh versions of Excel and PowerPoint. Microsoft urged users to immediately install a new patch designed to plug the hole.

### Short Takes

MICROSOFT and Stockholm-based LM ERICSSON TELEPHONE CO. disclosed a mobile technology joint venture, which will now become part of Ericsson's systems integration business. ... THE FEDERAL COMMUNICATIONS COMMISSION voted the Oct. 1 deadline for the rollout of wireless location services after carriers failed to comply.

# Users Grumble About Microsoft's Pricing Plan

## Say licensing policy for high-end server software tacks on additional costs

BY LEE COPELAND

**A**S MICROSOFT Corp. drives its stake deeper into the enterprise software market, some users are voicing concerns about how the software giant's licensing affects the costs of moving to high-end servers.

About 400 companies have adopted Bill Bell, Pa.-based Unisys Corp.'s ES7000 32-processor servers, which are equipped to run Microsoft's Windows 2000 Advanced Server and Datacenter operating systems. And while initial reports indicate that Microsoft appears to have tackled many of the technical problems that dogged previous versions of Windows, several users said the company is stumbling into the typical licensing pitfalls of the high-end server market.

Health eConex, for exam-

ple, replaced 10 Compaq ProLiant DL360 servers with one eight-processor ES7000 machine last January, said Ray Peddin, executive vice president at the health care transaction processing firm.

Park Ridge, Ill.-based Health eConex expects the consolidation project to reduce its annual maintenance costs, but shifting to the server-capacity pricing model of the 32-bit Datacenter operating system tacks on additional costs, said Peddin.

"I wish Microsoft would change its licensing policy to be more multiprocessor-friendly," he said. "But complaining and paying are two different things." Peddin said he still anticipates migrating to Microsoft Datacenter in the near future to support a 32-processor environment.

"It's a costly license," said Ed Bell, CIO at Commonwealth

Financial Network. "I am using eight processors now and doing fine, but I'm going to hit a ceiling soon."

The Waltham, Mass.-based investment brokerage also added an ES7000 to its back-office environment to boost capacity and to consolidate several two- and four-way Unisys and Hewlett-Packard Co. servers to one ES7000 machine. But the firm runs its applications using Windows 2000 Advanced Server in an eight-processor configuration.

Bell said he expects to pay an additional \$300,000 to shift to the 32-bit Datacenter system because of Microsoft's pricing model.

The driver behind the server-capacity-based pricing approach is that fewer small boxes are being sold, so vendors are trying to make up the difference with stiffer licensing fees on larger servers, said William Snyder, an analyst at Stamford, Conn.-based Meta Group Inc.

"This is a familiar issue for their mainframe brethren, but Microsoft customers are used to a box price, and now there's another variable associated with more CPU [use]," he said.

Microsoft charges server and client-access licensing (CAL) for the Windows 2000, Windows 2000 Advanced Server and Datacenter operating systems, which support up to four, eight and 32 processors, respectively. CAL pricing requires users to track the number of devices that access the system, such as PCs and terminals, said Rebecca Lawson, business manager for Windows NT Server at Microsoft.

But that server and CAL pricing model causes some users to pay for more processing power than they're using. It also requires customers to strictly track access to stay compliant with CAL terms, which is an additional chal-

## Microsoft's Server Licensing

Applies to which operating system? Windows 2000, Windows 2000 Advanced Server and Datacenter.

**What's the policy?** Microsoft charges server and client-access licensing (CAL) for the Windows 2000, Windows 2000 Advanced Server and Datacenter operating systems, based on the usage of devices such as PCs and terminals. Datacenter is only available through hardware vendors.

**What's the problem?** Some users are paying for a 32-processor license, even though they use less processing power.

**What's new?** Microsoft is considering several options, including per-processor licensing for future releases of Windows server software. In August last year, it allowed \$30,000 users to pay per processor or via CAL terms.

lenge for large organizations.

"We're looking into these concerns," Lawson explained. "We've heard that customers would like to pay based on the number of processors and capacity."

Facing long-standing complaints from its mainframe users running the z/OS operating system, IBM introduced its Workload License Charges pricing model last October [News, Oct. 9, 2000]. Under this scheme, customers are charged based on actual usage measured in four-hour time periods, instead of on projected peak usage.

Snyder advised prospective buyers to look at the overall five-year cost of the hardware, software and upgrades to determine whether the business case for the new hardware justifies the increased licensing costs.

**Quick Links**

For more about Microsoft's licensing changes, visit our [www.computerworld.com/qc/010901](http://www.computerworld.com/qc/010901)

## SQL Complaints Force Fee Changes

Microsoft changed its SQL Server 2000 licensing terms to include a per-processor pricing option last year in response to user complaints, company officials said.

One Microsoft customer that ran into these licensing issues is Motorola, which-themed La-2-Day Inc., which also uses an ES7000 to run its large SQL Server database.

Gary Clark, director of IT services at the \$2.3 billion hardware maker, said the old pricing model caused the company to pay for full processor capacity, even on partitioned systems that used only partial processing power.

"We had to upgrade from an eight-processor to a 32-processor license to get out of paying for additional [unused capacity]," he said.

"There is some reasoning behind it, though I don't agree with it."

But Clark added, Microsoft eventually allowed La-2-Day to pay per-processor fees, which reduced its licensing costs for SQL 2000.

Higher prices are a standard part of the high-end server market, said Martin Koenigs, manager of database services at Addison, Texas-based Mary Kay Inc. The \$2 billion maker of cosmetics installed an ES7000 in May to power its SQL Server database.

"Isn't the Microsoft's prices either, or prices in the software market as a whole," said Koenigs. But enterprise-class solutions come with enterprise-class prices, he noted.

—Lee Copeland

## Microsoft Halts Volume Licensing for NT Server 4.0

*Could reveal support plans for operating system by year's end*

BY CAROL BLINA

Microsoft Corp. last week put a stop to the volume-licensing program for its 5-year-old Windows NT Server 4.0 operating system, which still commands wide corporate use.

Microsoft spokesman Dan Leach cited "a steady increase in demand for Windows 2000 and a decrease in demand for NT 4."

The company, however, has yet to declare when support for NT Server 4.0 will cease. That announcement is expected by the end of the year.

Tom Bittman, an analyst at Stamford, Conn.-based Gardner Inc., said support, rather than volume licensing, looms as the more consequential issue for corporate users.

"The most important thing that clients need isn't so much support for decades — although I think there's a lot of companies that would like that. But the most pragmatic thing they need is long-range warning," he said.

"For a service, plenty of warning" is somewhere in the range of three to four years," Bittman added. "You don't come out and say, 'We're going to stop support in 18 months.' That's not right."

Some users predicted that they will need support for several years but would be able to manage it with advance notice in the range of 6 to 18 months.

"At least take us through until the next version comes out, whether .Net (Server) or the next interim step," said Richard Eggleston, information systems director at Elkhorn, Wis.-based Arrow Products Inc. Otherwise, he said, users will be left with only one option: Windows 2000 Server.

Windows NT Server 4.0 will continue to be sold on an individual-license basis through retail outlets. But licenses can no longer be purchased through the version, competitive or product upgrade programs.

Volume-licensing customers who need licenses for new installations of Windows NT Server 4.0 have an additional choice: They can purchase licenses for the Windows 2000 server operating system through a "downgrade" option.

Leach confirmed that customers choosing that option will find the price is higher than their original volume price for Windows NT Server 4.0. But the cost will be less than the individual-copy retail price, he noted.

By purchasing the downgrade option for Windows NT Server 4.0, a customer retains the right to later upgrade to Windows 2000 at no additional cost, Leach said. ■

## Windows Life Cycle

Microsoft last week discontinued the volume-licensing program for its Windows NT Server 4.0. The company's plans for other operating systems are as follows:

OPERATING SYSTEMS	LAUNCH DATE	VOLUME-LICENSING DISCONTINUANCE	END DATE SUPPORT
<b>SERVER OPERATING SYSTEMS</b>			
Windows 3.5x	September 1984 (NT 3.5 released)	June 1997	Dec. 31, 2001
Windows NT Server 4.0	Sept. 1996	Oct. 1, 2001	To be announced
Windows 2000 Server	February 2000	To be announced	To be announced
<b>DESKTOP OPERATING SYSTEMS</b>			
Windows NT Workstation 3.5x	July 1994	June 1997	Dec. 31, 2001
Windows 95	August 1995	July 1, 2001	Dec. 31, 2001
Windows NT Workstation 4.x	July 1996	June 30, 2002	June 30, 2003
Windows 98	June 1998	July 1, 2001	June 30, 2003
Windows Millennium Edition	September 2000	April 1, 2001	To be announced
Windows 2000	February 2000	March 31, 2003	To be announced

## .Net Push Raises Exchange Users' Ire

BY JENNIFER HUBBARD

Messaging administrators came to Microsoft Corp.'s MEC 2001 conference last week hoping to learn about Exchange 2000 and instead got a heavy dose of .Net, even though they're still struggling with upgrades to Active Directory and Exchange.

One IT manager from a California food manufacturer said she probably won't come to the event next year, since there was so little useful information for her this time.

Users at the Orange County Convention Center here said they were looking for guidance on their Exchange migrations — specifically, on how to move data and manage system functions — not general Exchange overviews and pitches for

.Net. They also said there wasn't enough information on planning for .Net in Active Directory and Exchange 2000 deployments.

Paul Flessner, senior vice president of Microsoft's .Net Enterprise Server division, downplayed Exchange-related issues in his keynote talk and urged developers to start building applications for .Net. He said developers shouldn't worry about what the now vaguely defined .Net will require, since anything written with Simple Object Access Protocol and XML embedded in it will work with .Net.

The lack of focus on Exchange implementations may leave users with more questions than answers, said Dana Gardner, an analyst at Aberdeen Group Inc. in Boston.

"By going from Exchange 5.5 to 2000 and making all the infrastructure and repository changes that entails, you now know that the next version of Exchange in 2003 to 2004 will require yet another substantial change to another repository — one based on SQL.... To wait and move once may make more sense," he said.

However, even users frustrated with Microsoft's business strategy said they likely won't change plans to migrate to Exchange 2000, since it would be costly and complicated to switch direction now.

A year after the release of Exchange 2000, the vast majority of Exchange users have yet to migrate to that version, let alone consider the next step, according to Ferris Research Inc. in San Francisco.

In a Ferris Research survey released in March, respondents estimated that by September, 20% of Exchange seats would run Exchange 2000, with 80% of users on Version 5.5.

"We've learned that Exchange changes are easier to migrate to Exchange 2000 than Notes/Domino users have been to migrate to Domino R5," the report said. "Nevertheless, most Exchange sites probably won't be Exchange 2000-based until late 2003."

Many users agreed that Microsoft won't be able to take over the high-end computing functions of Unix systems or complex workflow capabilities of software makers like FileNet Corp. in Costa Mesa, Calif. At best, Microsoft might be able to serve as the connector among those systems, they said.

But, Gardner noted, IBM is already beginning to deliver on what Microsoft hasn't fully delivered. ■

# Microsoft Launches Security Initiative

*New tools, services will make it easier for users to patch Windows, company claims*

BY JAHUMAR VILARIN

A security initiative launched by Microsoft Corp. last week should make it easier for enterprises to secure, and keep secure, their Windows environments, users and analysts said. But Microsoft needs to do more in terms of developing products that pose less of a security risk in the first place, they added.

"I can only say it is about time," said Edward York, chief technology officer at 724 Hosting Inc., an application hosting service in Lompoc, Calif.

"Microsoft has made it next to impossible for network administrators to learn how to secure their servers properly. [so] this is a major step in the right direction," he said.

In an apparent response to growing concerns relating to the security of its products, Microsoft last week rolled out a two-phase initiative called the Strategic Technology Protection Program (STTP). The program is intended to make it easier for users to patch their Windows environments against vulnerabilities and threats, such as the Code Red and Nimda worms.

But the initiative doesn't address the core issue of delivering secure products, cautioned John Pescatore, an analyst at Stamford, Conn.-based Gartner Inc.

"What we are seeing here is the patching process getting a lot better and faster... but that cannot be the endgame," Pescatore said. "What we need to see are better Microsoft products out of the box."

Microsoft's move came less than two weeks after Gartner advised companies to consider

alternatives to Microsoft's Internet Information Server (IIS) software following the humming it got by the Nimda and Code Red worms.

As part of the first phase, called Get Secure, Microsoft last week announced a new security tool kit available for download and on CD. The tool kit contains all the current service packs and critical security patches for Windows NT 4.0, Windows 2000 and IIS.

Also included is an IIS lock-

down tool that disables all functions and settings on Web servers that could be exploited by attackers.

The kit is going to make it easier for users to secure and lock down their systems and give them a central point to get all their patches from," said Josh Irsul, MIS manager at Holyoke Mutual Insurance Co. in Salem, Mass.

In the second phase of its STTP program, called Stay Secure, Microsoft will roll out tools and services aimed at helping firms stay updated on all the recommended patches and fixes.

Microsoft said it will deliver

## Right Direction

Components of Microsoft's Strategic Technology Protection Program include the following:

### PHASE 1: Get Secure

- New security tool kit with hot fixes and patches for Windows NT 4.0 and Windows 2000, as well as an IIS Lockdown tool
- Free virus-related product support via toll-free hot line
- Customer outreach program

### PHASE 2: Stay Secure

- Comprehensive security roll-up packages within 60 days
- Windows auto-update security hot fixes for businesses
- A version of Windows Update that enterprises can install internally and customize as needed

cumulative patches bimonthly for Windows 2000. Administrators need to apply only the latest patch to ensure that the operating system is fully patched. The first such patch will become available within 60 days, the company said.

Also in the pipeline, due in

December, are tools that automatically identify potential system misconfigurations and suggest changes. And the company said it will enable firms in the second quarter of next year to host their own Windows Update sites and control what patches their users apply. ■

## New Service Warns of Network Attacks

*Worldwide reports give businesses more time to deal with worms and viruses*

BY JAHUMAR VILARIN

Security Focus Inc. this week will formally launch a subscription service, called ARIS Predictor, that the company says will alert corporations to pending network and virus attacks before they occur.

The service works by automatically collecting and analyzing intrusion and incident data from more than 2,000 computers scattered across 30 countries, according to the San Mateo, Calif., security firm.

"There's a demand for these services because companies don't have the resources to look at all the vulnerabilities and threats and then try to decide which ones are relevant to them," said Allan Carey, an analyst at IDC in Framingham, Mass.

Security Focus offers "a service where you receive customized reports based on a profile of your network," said Carey. That makes it the first

structured and customizable as well as most comprehensive service of its kind, according to Carey.

But others have been attempting, at various levels, to give enterprises more warning when it comes to dealing with security threats.

A user group called the Anti-Virus Information Exchange Network (AVIEN) has been

quietly running a \$99 subscription-based Early Warning System (EWS) that is consistently hours faster than other alerts in warning members of impending viruses and worms, said founding member Robert Vibert. AVIEN's member's include security professionals from companies such as 3M Corp., Electronic Data Systems Corp., Ford Motor Co., Nortel Networks Corp. and Prudential Securities Inc.

The group uses the EWS system as a bulletin board to exchange virus and vulnerability

information and alert one another of suspicious incidents before they explode into real problems, said Vibert, whose Braeside, Ontario-based company, Segura Solutions Inc., maintains the service. With both the Nimda and Code Red worms, users were able to alert one another a good three to four hours before antivirus vendors had their alerts, he said.

"Whenever we see new malicious code is discovered in the wild, the AVIEN community shares the details as it unfolds, even prior to the antivirus industry having a chance to obtain and analyze the malicious code, publish their findings and write new [patches]," said Ross Cluett, a member of EDS Canada's information systems security group.

"We can construct defenses before the virus hits our gateway, which is invaluable in containing an outbreak," said Paul Schmelch, supervisor of support services at the University of Texas, Dallas, which is part of the AVIEN network.

AVIEN is the main reason the university had "zero infections from Anna Kournikova, one of the most prolific viruses ever," Schmelch said. ■

## Network Intelligence

The ARIS Predictor system generates the following reports:

- Port report:** Frequency of attacks against specific ports
- Source IP:** Attacks originating from specific IP addresses or IP ranges
- Source country:** Frequency of attacks from specific countries
- Attached products:** Attack types targeted at vendor products
- Source ISP:** Frequency of attacks originating from specific Internet service providers
- Attacks targeting specific port:** Types of attacks and frequency of attacks directed at particular ports





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### Part report: Frequency of attacks against specific ports

**Source IP:** Attacks originating from specific IP addresses or IP ranges

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**Attached products:** Attack types targeted at vendor products

**Source IP:** Frequency of attacks originating from specific Internet service providers

**Attacks targeting specific ports:** Types of attacks and frequency of attacks directed at particular ports

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## BRIEFS

## Compaq Recalls 1.4M Notebook PC Adapters

Compaq Computer Corp. recalled 1.4 million IBM power adapters used with some of its Armada and Prosignia Notebook PCs, saying they can overheat and cause potential fire hazards. The notebooks themselves aren't affected by the recall, said Compaq, which bought the problematic adapters from an unidentified supplier.

## Deal to Meet Profit Target; Gateway Slides

Dell Computer Corp. said it expects to meet revenue and profit targets for its third quarter ending Nov. 2, despite temporary supply constraints after the Sept. 11 terrorist attacks. PC rival Gateway Inc. increased its projected loss for the third quarter ended Sept. 30, but the San Diego-based company is still predicting a fourth-quarter operating profit.

## Compaq, Others Detail Pocket PC Plans

Compaq and several other hardware vendors announced handheld devices based on Microsoft Corp.'s Pocket PC 2002 operating system, which was released last week. Previously, Hewlett-Packard Co. had been the only major vendor to detail its plans for supporting the software. Pocket PC 2002 has a variety of new features for enterprise users.

## Short Takes

THE NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY awarded a total of \$5 million in funding to nine companies and universities doing research to improve the security of things such as electrical grids and air traffic control systems. . . . Bedford, Mass.-based vendor RSA SECURITY INC. said it expects to report a third-quarter loss of up to \$34.1 million on revenue of about \$82 million.

## IBM Server Gives Users More High-end Options

New Unix system matches Sun, HP boxes

BY LEE COPELAND

IBM LAST week launched its 32-processor p690 server, a machine that analysts and users said will intensify the competitive landscape in the high-end Unix market.

Code-named Regatta, the p690 includes features such as server clustering, Linux support and partitioning. While IBM hopes those features will strengthen its high-end Unix foothold, users said the server increases their options in a market that's dominated by fewer vendors.

"The market is more competitive now," said Mark Szczekowski, senior director of worldwide data center operations at Gap Inc. in San Francisco. The p690 should help IBM chal-

lenge Sun Microsystems Inc.'s high-end machines more effectively, he added.

"This is probably a break-through technology for IBM, but they have a lot at stake in terms of follow-through," said Joe Giacometti, senior vice president of IT at supermarket giant Ahold USA Inc. For instance, IBM must prove that

## AT A GLANCE

## Setting Sail

The p690 Regatta:

- Runs up to 32 Power processors
- Has 13 to 13-GHz copper-based chips
- Costs \$450,000 to eight-way configuration; \$1 million for 32-way configuration
- Supports AIX 5L or Linux
- Will be available by year's end

the p690 meets application-compatibility requirements and that its new partitioning technology is solid, he said.

Chantilly, Va.-based Ahold received a p690 last Monday but has yet to put the system through quality assurance and compatibility testing. Still, Giacometti said he expects to consolidate his 300 IBM RS/6000 servers into fewer p690 machines and to possibly run distributed applications on the Linux operating system.

IBM has long supported partitioning on its mainframes. But the ability to partition the p690 is a big step forward for its Unix division, said Richard Dougherty, an analyst at Envisioning Corp., a Seneca, N.Y.-based consulting firm. Partitioning lets users run multiple applications simultaneously on a single server.

Unix rivals such as Sun and Hewlett-Packard Co. already

support partitioning on some servers, such as the high-end Sun Fire i5K system Sun announced two weeks ago. Dougherty said IBM's lack of partitioning has made it harder for users to compare pricing if they "wanted common elements from each vendor to bargain down on price."

"There hasn't been the ability to do an apples-to-apples comparison of high-end IBM Unix machines against Sun," said Mike Villibit, deputy director of resources at the San Diego Supercomputer Center at the University of California.

IBM is also touting energy conservation features that are appealing to users such as Gap. Szczekowski said the \$4 billion clothing retailer expects to save \$100,000 in electricity costs this year after switching from a Hitachi Data Systems Corp. mainframe to a newer IBM S/390. That follows Santa Clara, Calif.-based Hitachi's exit last year from the mainframe market.

Szczekowski said he hopes to see similar savings if Gap uses the p690 to consolidate its large server farm. ■

## Start-ups Prepare Predictive Routing Tools

Goal is to make Net an alternative to WANs

BY JAMES COPE

A growing number of start-up vendors are developing technologies that plot the fastest and least-costly data-routing paths across the Internet in an effort to create a viable alternative for users who now favor the predictable performance of private wide-area networks.

At least five new firms have such predictive routing products or services in the works. Last week, for example, San Jose-based netVing Inc. said it plans next month to ship routing-control software designed to find the fastest path for data between different points on the Internet. Pricing will range from \$150,000 to \$300,000.

The netVing announcement follows the introduction of similar technology two months ago by San Mateo, Calif.-based RouteSwitch Technologies Inc. [News, Aug. 20]. Opix Inc. in Tempe, Ariz., and Network Physics Inc. in Mountain View, Calif., also have products in beta test, and Newton, Mass.-based Sockeye Networks Inc. said it plans to offer predictive routing as a service.

Adam Joffe, director of technical operations at San Diego-based Sony Online Entertainment Inc., said the developer of computer and Internet-based games has been beta-testing netVing's Flow Control Platform (FCP) for the past month. Sony Online is using the software to route communications between host servers and online game players across the networks of five Internet ser-

vice providers. About 85,000 gamers are logged on at any given time, Joffe said.

Before, the only way to offset problems caused by Internet congestion and service provider issues was to "manually switch traffic from one ISP to

another," Joffe said. With FCP, "I can create and predict how I want traffic to flow."

But the Internet, "at least at the core, is fairly consistent in performance" now, said Jim Slaby, an analyst at Cambridge, Mass.-based Giga Information Group Inc. That may undercut claims that there's a widespread need for predictive routing technologies, he added. ■

## Directing Traffic Flow Across Multiple ISPs

FCP, introduced by netVing last week, is aimed at finding the best routes — based on cost and performance — for routing Internet traffic across multiple Internet service providers.



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# National IT Protection Plan Update Delayed

*Reorganization of antiterror efforts puts plan on hold until early next year*

BY DAN VERTON  
WASHINGTON

**T**HE BUSH administration's revamped National Plan for Information Systems Protection, due last month, has been delayed until at least January.

That delay came to light last week, when the administration appointed a cybersecurity czar to lead the new Office of Cyberdefense within the White House.

Richard Clarke, the longtime national coordinator for security, infrastructure protection and counterterrorism for the National Security Council, will head the office created as part of a governmentwide antiterrorism reorganization in the aftermath of the Sept. 11 attacks. The office will fall under the newly created Homeland Security Office, a cabinet-level post headed by former Pennsylvania governor Tom Ridge.

The attacks gave a new sense of urgency to critical-infrastructure protection efforts by the government and private-sector companies. However, sources familiar with the Bush plan said the reorganization will delay the next version of the National Plan for Information Systems Protection until the beginning of next year.

"It's just sort of hanging out there," said one official who works closely with the Bush Partnership for Critical Infrastructure Security, the private-sector group leading the effort to write the plan.

The future of the Commerce Department's Critical Infrastructure Assurance Office (CIAAO) is also in doubt. With a new homeland defense structure being put in place under new leadership, including cy-

berdefenses under Clarke, one source said that CIAAO Director John Tritak "doesn't know where his office stands yet."

Members of congress, including Senate Government Affairs Committee Chairman Joseph Lieberman (D-Conn.), are beginning to look more closely at how the government is organized for homeland security, including cybersecurity. A source said Tritak will likely

"punt" in response to Congressional requests for an explanation, simply because nobody knows yet what homeland defense is going to be.

Sources also said former U.S. Army Special Forces commander Gen. Wayne Downing (Ret.) will take over Clarke's counterterrorism responsibilities under Ridge. Downing led the task force that delivered the final report on the 1996 terrorist bombing of the U.S. military's Khobar Towers complex in Saudi Arabia.

"I've always thought that Clarke's job was more than one

mere mortal human being could handle," said Frank Cilluffo, chairman of the Cyber Threats of the Future task force at the Center for Strategic and International Studies in Washington. "We're talking about the real A-Team here," said Cilluffo, referring to Downing, Ridge and Clarke. "These are not just good proposals, but the best way to go."

Harris Miller, president of the Arlington, Va.-based Information Technology Association of America, which was instrumental in forming the IT sector's Information Sharing and Analysis Center, said the association is "very pleased" with the appointment of Clarke as

the point person in the battle to protect the nation's IT and Internet infrastructure.

"Dick knows how to get things done, how to work with industry and how to meet the challenge globally as well as domestically," said Miller.

"With the backing of the president, he will substantially reduce much of the confusion and internal friction that has hampered government efforts in information security."

Cilluffo agreed. "This is an issue of marrying up efforts of the government and private sector," said. "Implementation and execution is not going to be Uncle Sam."



CLARKE will take over as cybersecurity czar.

## Lack of IT Integration Hurts Chem/Bio Warfare Defenses

BY DAN VERTON  
WASHINGTON

A lack of interoperability among inventory management systems has made it impossible for the Department of Defense to guarantee the availability and effectiveness of its stock of chemical and biological warfare protective suits.

The Pentagon can't monitor the status of the entire inventory of protective equipment because the military services and the Defense Logistics Agency (DLA) use at least nine systems to manage inventory, according to a report released Oct. 2 by the General Accounting Office. All the systems use different data fields and contain records that can't be easily linked, the report stated.

As fears grow about the possibility of terrorist attacks involving chemical and biological agents, the Defense Department's IT problems have rendered it unable to tell with certainty how many of its protective suits would adequately shield servicemen in the event

of war. Except for systems used by the Air Force and Marine Corps, most Defense Department records omit data regarding suit expiration dates, the GAO concluded. In addition, the department can't easily identify, track or locate defective suits because inventory records don't always include contract and lot numbers.

The Navy doesn't know when its suits will expire because it doesn't require inventory managers to include the expiration dates in inventory records, the GAO report stated. In fact, 67 naval ships were found to have "severe" suit shortages due to expirations.

The GAO report recommended that the DLA standardize on one of the systems under development by the Air Force or Marine Corps, because those systems will use contract and lot-number fields and enable the services to estimate the expiration dates of suits. But

neither system is interoperable with other systems used by the Defense Department.

A spokesman for the DLA directed Computerworld to the agency's official response to the GAO report.

In a written response, Anna Johnson-Winegar, assistant to the secretary of defense for chemical and biological programs at the Pentagon, acknowledged the problems that have been caused by the multiple management systems. But,



THE PENTAGON can't easily track its supply of protective suits like this one.

she said, a plan is under way to integrate those systems.

The DLA has initiated a business system modernization program to replace legacy systems by 2005, according to Johnson-Winegar. "It will be state-of-the-art," she wrote.

Currently, the DLA Standard Automated Material Management System doesn't permit the addition of data fields to show contract, lot number or the expiration date of shelf items in the inventory management records, wrote Johnson-Winegar. However, this will be a requirement of the new system.

Steven Aftergood, a defense analyst at the Federation of American Scientists in Washington, said discovery of the IT deficiencies in the Defense Department's inventory systems comes at a critical time.

"IT solutions could help mitigate the severe information-coordination issues that contributed to the lack of preparedness on Sept. 11," said Aftergood. "Similar problems could exacerbate any future emergency." ▀

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## BRIEFS

## Sun Releases Beta Code For Solaris 9...

Sun Microsystems Inc. has released an initial beta-test version of its planned Solaris 9 operating system for use in testing the compatibility of existing Solaris-based applications. But the company said the beta code lacks many of the features that are expected to be included in the finished version of Solaris 9, which is expected to ship in the first half of next year.

## ... Puts StarOffice 6.0 Download on Its Site

Sun has made a beta-test version of its upcoming StarOffice 6.0 office software available on its Web site. The StarOffice upgrade, a rival to Microsoft Office that's expected to be ready for shipment next year, will run on systems as a series of separate applications instead of launching all the products at the same time, Sun said.

## Cisco Adds Routers, High-Speed IP Support

Cisco Systems Inc. last week rolled out two high-end IP routers aimed at network service providers and made its 12000 series of backbone routers available for use on the edges of networks. That capability was designed to let service providers offer corporate users higher-speed IP applications and services, such as voice over IP and video, Cisco said.

## Short Takes

Seattle-based CRAW INC. introduced a supercomputer priced at less than \$1 million and made by Tokyo-based NEC CORP., the first product of a reseller deal signed by the two companies last spring. ... Dublin-based ATLANS LTD. began accepting job Web domain registrations again after shutting down its operations for three days in order to fix performance shortcomings.

## Foreign Laws Alter IT Privacy Policies

## Users Ask on European, Canadian rules

BY PATRICK THIBODEAU  
CLEVELAND

IT MANAGERS have long known that privacy rules can have a direct impact on database design and customer relationship management systems, but now they're learning that foreign legal requirements can also affect IT in ways that most

wouldn't expect. Take, for example, the case of Eaton Corp. Eaton, a diversified manufacturer with 52,000 employees, has the ability to conduct remote periodic scans of PCs at its European offices from its U.S. headquarters here to ensure that its systems are operating with an accurate inventory of licensed software. It also

conducts remote virus scans.

But employees have to be notified that their systems are about to be scanned, said Jack Matejka, Eaton's director of IT security. The European rules were intended to give employees notice if a company decided to review data files or a browser's cache files, but they also affect routine system maintenance. "This is one of the new issues that we have to learn about," Matejka said.

Continued from page 1

## FTC

given privacy any due consideration, those are the ones that should now be getting concerned," said Peter Reid, a privacy expert at Electronic Data Systems Corp.

Muris also said there should be no distinction between on-line and off-line databases when privacy issues are considered. That means legislation that includes privacy protection for all customer data could have a much more sweeping effect on corporate database management.

Ron Fleischer, a Washington attorney who represents companies on privacy issues, said Muris' view regarding off-line databases is going "to make it more difficult" for legislation aimed exclusively at online practices to win approval.

Muris' predecessor at the FTC, Democrat Robert Pitofsky, believed the private sector wasn't vigorous enough at safeguarding consumer privacy and sought baseline legal standards. Muris said the emphasis now should be on enforcement.

"I'm not saying, 'No-how, never, no legislation.' I think, however, given all of the recent legislation... we at least need to pause to figure out how to effectively enforce the legislation we have," said Muris, who outlined his direction last

week at the Privacy 2001 conference here.

"It's a pretty clear retraction of where the FTC was before," said Sol Berman, a technology legal expert at the Ohio Supercomputer Center's Technology Policy Group, which sponsored the conference.

Any position taken by the FTC doesn't preclude Congress or individual states from adopting new privacy rules. But Muris' opposition to new regulations will affect the congressional debate on online privacy, where a number of related bills are pending. It's uncertain when Congress, which has been focused on security issues since Sept. 11, will resume debating privacy legislation.

Muris defended his position to "pause" regulation by outlining some of the issues that would have to be solved before more legislation, such as access and security requirements, would even be possible. Access, in particular, worries many in corporate IT because it could require them to give customers access to data that's stored in disparate databases.

Muris also acknowledged complaints in the IT industry that privacy rules will increase costs. "We need much better data than we have about the benefits, trade-off before we proceed," he said.

Companies that post privacy policies are legally obligated to follow them, otherwise, they

## The FTC's New Direction

Telemarketing: Plans national "do-not-call" list

Spare: Will invest in software to help root out fraudulent and deceptive spam

Financial privacy: Plans Dec. 4 workshop on improving privacy notions required under the Gramm-Leach-Bliley Act

Privacy: Will do more to match online practices against a company's posted privacy policy

could be subject to enforcement under the FTC's rules governing deceptive practices.

Fran Maier, executive director of Truste, a nonprofit privacy organization in San Jose, said the push for enforcement "bodes very well for us" and she expects more companies to use certification programs such as Truste's.

Ari Schwartz, a policy analyst at the Center for Democracy and Technology in Washington, said he thinks minimum safeguards are needed, but he took some heart in the fact that Muris considers privacy to be an important issue.

"The focus on privacy is still there," he said, "so we feel that is something to work with."

And there's a lot to learn. International privacy policies are permeating planning at corporations struggling to comply with the European Union's privacy rules and an emerging set of strict Canadian data sharing requirements.

Cincinnati-based Procter & Gamble Co. solved the problem of global privacy compliance with customer privacy rules that meet Europe's standards, which are considered the most demanding internationally.

Adopting privacy standards for various countries "creates added cost and potential problems," said Mel Peterson, privacy manager at P&G. But that wasn't the only reason for adopting the higher standard. Strong privacy rules also build customer trust, he said.

"If you're not giving [consumers] control, why should they have any confidence in giving information to you?" said Peterson, at the Privacy 2001 conference sponsored by the Ohio Supercomputer Center's Technology Policy Group in Columbus.

## Sphere of Influence

Companies operating in the U.S. aren't required by law to offer specific privacy protections unless they're in a regulated industry such as financial services or health care. But foreign privacy standards will affect more U.S. firms, primarily because of actions by Canada, the U.S.'s largest trading partner.

Canada has adopted a set of privacy rules, similar to Europe's standards, that started being phased in last January. They apply to regulated businesses, airlines, banks, telecommunications firms and broadcasting organizations. By 2004, they will cover any business that collects personally identifiable information in Canada.

Giving customers a choice on how information is used "is a better way to earn their loyalty," said Peter Cullen, chief privacy officer at the Royal Bank of Canada in Toronto. "We think of this more as a business opportunity as opposed to a regulatory burden or law."





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Sun

# SunTrust Banks on ROI From Help Desk App

**Expects two-year return on software that lets workers reset their network passwords**

BY LUCAS MERRIAN

**S**UNTRUST BANKS INC. is launching an enterprise-wide help desk application that it expects to allow its 27,500 employees to reset their own network passwords over the Internet. The effort should pay for itself within two years by reducing by at least 25% annually the number of help desk inquiries that require technical assistance.

"[The] whole objective is to reduce the manual effort in resetting passwords for employees and shorten that whole resolution cycle when an employee is locked out and can't be productive," said Nancy Tripp, president of SunTrust's Solution Center in Atlanta.

Analysts described SunTrust's project as cutting-edge and reflecting a greater trend in identity management. "The ROI measurement can be significant," said Peter Lindstrom, an analyst at Hurwitz Group Inc. in Framingham, Mass. "The hard part is often collecting the [authentication] data upfront from employees."

## Time Saved

Tripp estimated the two-year return on investment based on a reduction in the amount of time that IT technicians spend resetting passwords and that employees are locked out of their computers.

To assist employees with technical problems, SunTrust runs two 24-hour call centers. About 65% of the call center inquiries can be resolved on the first phone call, with the other 35% requiring a technician's assistance; almost a quarter of those problems are related to resetting employee passwords.

Most password resets involve workers who have been locked out after consecutive attempts to log on or who haven't used their passwords for an extended period of time. That leads to automatic lockouts from the company's Windows NT, Novell and mainframe platforms, said Tripp.

Each time a request comes into the call center, an incident ticket must be manually

opened, and a record must be kept of how it was resolved. On average, each request ties up an IT technician for 10 minutes and costs \$20 to \$30, said Tripp. She added that SunTrust fields about 7,500 password reset requests per month.

Assuming that the company meets its goal of achieving a 75% adoption rate with the software during the next nine months, the system could save \$1.35 million to \$2.03 million in IT labor annually.

In June, SunTrust began installing the software application from Framingham, Mass.-

based Courier Corp. called ProfileBuilder, which creates a database of employees' personal information.

Another Courier application, PasswordCourier, sifts through the ProfileBuilder database to check employees' responses to challenges when they try to reset their passwords.

Tripp said the application "inherently supports strong security, because it asks employees two authentication questions" instead of the one or none that a help desk worker might ask.

*Continued from page 1*

## CA Suit

some current and former CA users said the suit could hamper the Islandia, N.Y.-based software vendor's attempt to improve its public image [Page One, Sept. 24].

"I think it will hurt CA's reputation," said Mike Stevenson, enterprise administrator at the Peel Regional Police data center in Brampton, Ontario. In such situations, he added, "many people will translate allegations into facts." The police data center relies on CA's flagship enterprise management product, Unicenter, to support 2,000 end users working off Windows NT and OpenVMS servers.

"Nobody in the industry really believes that CA has changed," said a technical support manager for a large public school district in the south-eastern U.S. that uses a mix of CA's mainframe-based software products. The manager, who asked not to be identified, is one of several users who said the suit further justifies his negative perception of CA.

The price-fixing case stems

from CA's \$3.5 billion buyout of Platinum in 1990. In the suit, which it filed Sept. 28, the DOJ charged that CA assigned one of its employees to "review and approve" Platinum's user contracts before the acquisition had been cleared by government agencies under antitrust laws—a practice the DOJ calls "gun jumping."

The DOJ, which also named Platinum in the suit, claimed that the two companies agreed that Platinum would limit the discounts and special contract terms that it offered to users. That "prematurely reduced competition between the companies," said Charles James, assistant attorney general in charge of the DOJ's antitrust division.

**I think it will hurt CA's reputation.**

MIKE STEVENSON, ENTERPRISE ADMINISTRATOR,  
PEEL REGIONAL POLICE

DOJ officials didn't return calls seeking comment on how long CA allegedly engaged in the illegal behavior. But based on the civil penalty of almost \$1.3 million that the DOJ is seeking from CA and Platinum, the period would have been nearly two months.

CA admitted that it sent a representative to Platinum during the takeover deal was announced in March 1990. But a CA spokeswoman said the company did nothing wrong, and she described the representative as "a semiretired employee who had no day-to-day responsibilities at CA [and] who fielded questions at Platinum as a focal point for Platinum employees."

In a separate statement, CA said that Platinum executives "made all business decisions" during the period covered by the DOJ's suit, "including those related to pricing and discounts."

Valerie O'Connell, an analyst at Boston-based Aberdeen Group Inc., said she doesn't expect the suit to have a lasting impact on how CA is viewed by users. "As far as CA's new image goes, that will not be hurt long term because behind the image is a reality that em-

## AT A GLANCE

### SunTrust Banks Inc.

• Headquarters: Atlanta

• **What:** Installed two new help desk applications that will enable its 27,500 employees to reset their own network passwords over the Internet.

• **ROI:** SunTrust estimates two year payback on the software because it will be able to reduce by 25% the number of help desk calls that have to be handled by technicians.

SunTrust faced a few hurdles in installing the software, including the challenge of tying employees' unique user identification to authentication questions they gave. But a 75-person pilot over the past few months helped iron out those issues, said Tripp. ▀

bodies substantive change—some of which has been in process for years," she said.

But Sherry Irwin, an IT consultant and chairwoman of the Toronto-based Canadian Software Asset Management Users' Group, said it appears "that the DOJ has a strong case and should be commended for taking this action."

Dick Goulet, a database administrator at a U.S.-based maker of electronic components, was even more blunt—and sarcastic. "It couldn't have happened to a nicer company," said Goulet, who used Platinum's Plan Analyzer database administration software until CA's acquisition.

Before the buyout, Goulet said, he was paying an annual maintenance fee of \$10,000 for 20 copies of the Platinum tool. But after CA bought Platinum in June 1990, he said, CA told him he would have to upgrade immediately to a full Platinum product suite at a cost of \$100,000, plus \$50,000 per year in maintenance fees.

Later, he added, CA said Goulet's firm would have to buy into CA's management and middleware products. That would have cost \$5 million to \$10 million, Goulet said. ▀

## THE STRAIGHT GOODS ON e-BUSINESS PLATFORMS.

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# Vendors Test IP-Based Storage Technologies

*Enterprise-level uses not expected for another year, according to analysts*

BY LINCOLN MERRILL

**T**WO GROUPS of vendors have set up separate transcontinental and global storage networks based on emerging IP-based data-transport standards. But the storage-over-IP technologies still aren't expected to be robust enough for enterprise uses for at least another year, say analysts.

IP-based storage has several potential advantages for users. For example, it would use the Internet's basic communications protocol instead of more expensive Fibre Channel connectivity technology.

In addition, Fibre Channel links are currently limited to distances of about 100 kilometers because the data packets break down quickly. That's a problem that forces IT managers to back up data to storage

devices in nearby data centers.

In one recent demonstration, IBM, Dell Computer Corp., Intel Corp. and five other vendors used off-the-shelf storage and switching equipment to transfer block-level data over IP between sites on the East and West coasts (see diagram, below).

Database records and other information were transferred over a 10G bit/sec. fiber-optic backbone at speeds of up to 2.5G bit/sec., the vendors said.

The switched storage-area network (SAN) sent about 1TB of data per hour between systems in Sunnyvale, Calif., and Newark, N.J., they added. The network was based on emerging standards known as iSCSI, Fibre Channel over TCP/IP (FCIP) and iFCP (see box).

Meanwhile, Compaq Computer Corp. and two other vendors said they used FCIP to

manage and replicate data among Fibre Channel SANs in Colorado Springs, Australia and the Netherlands.

Steve Duplessie, an analyst at Enterprise Storage Group Inc. in Milford, Mass., said the IP-based storage tests show that "the stuff works," even though the proposed standards haven't been finalized.

Standards are expected to emerge from the Internet Engineering Task Force by year's end. And vendors such as IBM and Cisco Systems Inc. are already marketing disk arrays, switches and software that can be used on intranets and other IP-based networks. But Duplessie and other analysts said it will likely be late next year before IP-based technology is ready to support enterprise-class storage applications.

Brian Haymore, a senior systems engineer at the University of Utah in Salt Lake City, said he sees iSCSI as the future of data storage. Haymore is testing eight storage arrays that can use IP to map block-

level SCSI commands and data over an Ethernet network. With IP, he said, the mapping can be done on the school's existing extranet and be managed by IT staffers who are already familiar with TCP/IP.

Mike Anderson, vice president of information services at The Home Depot Inc. in Atlanta, said IP networks hold promise for storage-related uses such as real-time data replication in backup and disaster-recovery applications.

But Anderson added that he wants to see increased product maturity and widespread user adoption before he considers iSCSI or other storage-over-IP technologies. ▀

**iSCSI Encapsulates SCSI data and commands in TCP/IP headers for transmission across storage networks.**

**FCIP A tunneling technology that uses IP networks to connect multiple Fibre Channel SANs.**

**iFCP Enables Fibre Channel devices to be integrated into IP network backbones.**

## Cartridge Storage Dispute Puts Users in the Middle

*Vendors sue over 'unqualified' tapes*

BY LINCOLN MERRILL

A behind-the-scenes dispute between storage vendors Imation Corp. and Quantum Corp. over Digital Linear Tape (DLT) products turned into a full-fledged legal battle last week, marked by dueling lawsuits and Imation's shipment of tape cartridges that Quantum has rejected for use with its drives.

For users, the legal action creates a quandary. Oshkosh, Minn.-based Imation said its new cartridge is compatible with Quantum's DLT drives. But Michael Brown, Quantum's chairman and CEO, warned that using Imation's media may void the tape drive warranties offered by Milpitas, Calif.-based Quantum. DLT is widely used for backing up and archiving data. About 1.7 million DLT drives and 70 million cartridges have been sold, said Quantum, which owns the technology.

Fara Yale, an analyst at San Jose-based Dataquest Inc., said Quantum has always used test-based licensing agreements to

strictly control which vendors can produce DLT cartridges authorized for its tape drives.

But Imation's lawsuit, filed in U.S. District Court in St. Paul, Minn., charges Quantum with violating antitrust laws by fixing prices for DLT cartridges and conspiring to monopolize the cartridge market.

Imation has been reselling DLT media made by other vendors. But the suit claims that Quantum refused to qualify Imation's cartridges and then invited it to join "an illegal tape cartel" under a deal that allegedly would have required Imation to drop its products.

Quantum responded by filing a suit in a California state court seeking to stop Imation from selling its Black Watch Digital Linear Tape IV cartridge. Quantum charged Imation with theft of trade secrets and unfair business practices.

Brown called Imation's suit "preposterous," saying that Quantum tried for two years to help Imation qualify its cartridges. But Frank Russomanno, a vice president at Imation, said the suit is aimed at making Quantum live up to a "promise of an open and fair market" for DLT cartridges. ▀

## IP-based Storage in Action

The demonstration SAN set up by eight vendors used an IP link to transfer data between iSCSI and Fibre Channel storage devices in New Jersey and California.



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## BRIEFS

## Mortel Expects Loss, More Job Cuts . . .

Mortel Networks Corp. warned that it expects to report a \$3.5 million net loss in U.S. dollars for the third quarter on revenue of about \$3.5 million from continuing operations. The Brampton, Ontario-based company also named Frank Dunn, its chief financial officer, to replace John Roth as president and CEO next month. In addition, Mortel announced plans to lay another 20,000 jobs through layoffs and the sale of business units.

## . . . And Agrees to Sell Clarify CRM Unit

As part of its divestment plan, Mortel said it agreed to sell the assets of its Clarify customer relationship management (CRM) software division to Chesterfield, Ill.-based Janssen Ltd. for \$200 million in cash. Janssen will take over existing non-contracts after the deal's expected completion this quarter.

## Revenue Shortfall to Put Compaq in Red

Compaq Computer Corp. disclosed that it expects to report a third-quarter operating loss of up to \$100 million on revenue of about \$7.5 billion. The new revenue projections in about \$1 billion below Compaq's earlier target for the quarter and would be down 20% from the \$11.2 billion in revenue the company reported for the same period a year ago.

## Short Takes

San Jose-based BEA SYSTEMS INC. said BEI Computer stepped down as CEO and is now chairman and chief strategy officer. Alfred Ching, BEA's chief operating officer, has taken over as CEO. . . . McLean, Va.-based MICROSTRATEGY INC. said 10% of its remaining employees, making its workforce to about 600 people - down from 1,900 workers at the start of the year.

## IBM Tries to Reassure Informix IDS Users

Company hopes to ease support concerns with first database upgrade since takeover

BY DAN VENTON

LAST WEEK took a first step down the long road toward allaying user fears about its commitment to the Informix database line by releasing its promised Informix Dynamic Server (IDS) upgrade.

The new version, dubbed IDS 9.3, includes a bundled set of database administration tools and additional data replication and spatial analysis capabilities. Those features were designed to help IDS users increase database efficiency and reduce administration costs, according to IBM.

On the strategic front, however, the release is as much a symbolic gesture to Informix users as it is a technical upgrade. Since the completion of IBM's \$1 billion acquisition of Informix Corp.'s database business in July, some analysts have questioned IBM's ability to support the seven separate code bases it bought from Informix in addition to its own DB2 Universal Database software. And many Informix users have expressed concern about being, as one customer put it, "seduced and abandoned" by IBM (Page One, Sept. 3).

But Janet Perna, general manager of data management solutions at IBM Software, has been trying to put those concerns to rest. Last week's shipment of IDS 9.3 follows comments Perna made last month, when she said IDS 9.4 is already in development and that IBM is committed to building a 9.5 release as well.

IBM last week also announced a new version of its DB2 Relational Connect tool that's designed to let IDS users develop applications on DB2 while maintaining their Informix infrastructures. Perna

said that upgrade, due out by year's end, will allow DB2 to access IDS 9.3 data as if it was stored natively in DB2 itself.

"Part of our strategy is to improve the coexistence between IDS and DB2," she said in an interview. "We think that most customers for new applications will select DB2. So it's important that IDS customer databases coexist with new DB2 databases."

Earlier this year, IBM delivered DB2 Relational Connect

support for databases from Oracle Corp., Microsoft Corp. and Sybase Inc. The Informix acquisition enabled similar support efforts for IDS to be accelerated, Perna said.

Roe Flannery, author of *Informix Handbook* (Prentice Hall, 1990), said his research indicates that IBM will continue to support the Informix products. "Yanking that support would be suicidal," said Flannery, who is also president of One Point Solutions, an Informix consulting firm in Novi, Mich. "I'm confident that Informix customers will be supported as long as they need it."

James Governor, an analyst

## Siebel Responds to Rivals With Web CRM Rollout

Analysts say market leader being pushed by its competitors

BY MARC L. BOWEN  
CHICAGO

Siebel Systems Inc., the leader in the customer relationship management (CRM) software market, is finally shipping an upgrade that gives users of its suite full access from Web browsers. But Siebel lags behind rival vendors in providing that capability, according to analysts.

The company announced the browser-accessible Siebel 7 release here last week at its annual user conference. The software is due out this quarter, putting it months behind similar rollouts by competitors such as PeopleSoft Inc. and Oxya Software Corp.

Steven Bonadio, an analyst at Meta Group Inc. in Stamford, Conn., said some users

who are beta-testing Siebel 7 have indicated that early versions of the software had "potential performance and usability issues."

In response, a Siebel spokesman said the San Mateo, Calif.-based company remains on track to deliver Siebel 7 this fall. Siebel "is committed to shipping the highest-quality product in the industry, and that single factor has driven our product release date," he said, adding that the software is being tested by 120 users.

## AT A GLANCE

## Siebel 7

The upcoming software has the following new capabilities:

- A Web-enabled architecture that gives users browser-based access to applications
- Built-in analytical tools with increasing forecasting and reporting capabilities
- Self-service applications for use by customers making purchases on the Web
- Industry-specific features for sectors such as finance, retail and energy services

## What's New Tack

Details on the company's July acquisition of Informix's database operations

IBM's business goals: To boost its position in the Unix and Windows database markets vs. Oracle, both technically and in terms of market share

What it got by the deal: IDS and six other database product lines, plus 130,000 Informix users and more than 2,000 developers


at Illuminata Inc. in Nashua, N.H., agreed. "IBM certainly didn't buy the Informix installed base just to hand it over to Oracle and Microsoft," he said. "IBM will do whatever it takes to keep the installed base happy, and a platform refresh is a pretty good start."

Boston-based AMR Research said in a recent report that Siebel's CRM software still offers more functionality than rival products do. But AMR also points to challenges faced by Siebel, which warned in July that its financial results would likely be below expectations for both the third and fourth quarters.

Other vendors have better products in areas such as call center and field service automation, AMR reported. Moreover, it added, enterprise resource planning vendors such as SAP AG, Oracle Corp. and PeopleSoft are catching up with Siebel on CRM sales and "creating a four-horse race."

Cheyond Communications, an Atlanta-based telecommunications service provider, went live with Siebel 6.3 software last January as part of a \$2 million CRM project. The full Web front-end support coming in Siebel 7 "is huge for us," said Cheyond CIO Gordon Kerr.

But Kerr added that he's still looking for Siebel to provide tools that let users view the status of customer interactions and other business processes from a single, Web-based "dashboard" console. ■



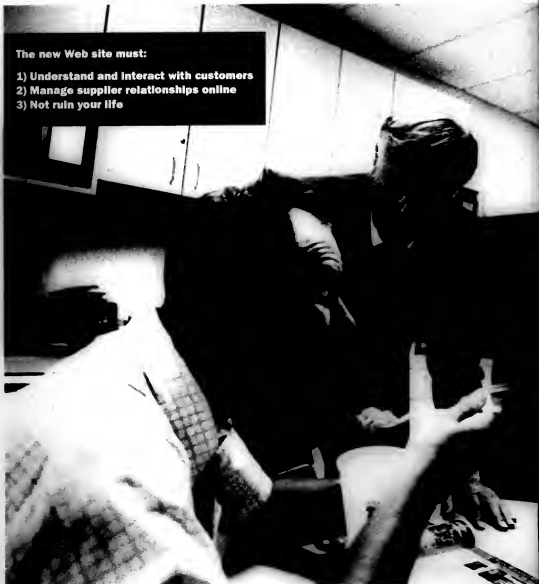
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management is asking for the moon, quickly and cost-efficiently develop a site that offers a personalized experience for customers and partners. In the past, building-in the kind of robust data analytics you're being asked for could take thousands of hours (most of them yours). But now there's help: Microsoft Commerce Server 2000.

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MARYFRAN JOHNSON

# The Biometric Age

IF THE CLASSIC 1960s FILM *The Graduate* were being made today, that one word of advice whispered into Dustin Hoffman's ear wouldn't be *plastics*. It would be *biometrics*. Yet in these days of resurging security awareness, it's no joke.

From fingerprints and facial recognition to eye-scanning systems and hand-geometry or voice-pattern matching, the field encompasses a diverse set of personal authentication technologies. Biometrics aren't based on something you know (a password) or something you have (a smart card), but on who you actually are.

You can't really call biometrics "the next big thing," because it's been around as a niche technology for decades. There are various authentication methods — predominantly fingerprint imaging — used in prisons, benefits systems, border-control operations and driver's license bureaus.

In the terrible wake of Sept. 11, biometrics are getting renewed attention from both the private and public sectors. Last week in Washington, I moderated a panel stocked with biometrics experts who all agreed that the public is primed for much stronger practices in authenticating identity. There are a staggering number of identity thefts in this country each year, with 400,000 to



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500,000 people "misappropriated" and used to perpetrate up to \$6 billion in fraud. Proving who you really are while also protecting your privacy has obvious appeal.

"The question now is how and where, not should we," use biometrics, says Paul Collier, executive director of The Biometric Foundation. But he also worries that the resurging interest in biometrics could backfire on the industry, as too many devices get deployed too rapidly and then fail for lack of integration with broader corporate security programs. Other

stumbling blocks to widespread adoption include the usual suspects: standards conflicts, integration headaches, product interoperability problems and cost concerns.

Inevitably, IT pros will be called upon to bullet-proof databases, select the right technologies to integrate with existing security systems, test the products and, of course, do it all cost-effectively.

But here's some small comfort: It'll be a lot more interesting than plastics. ■

PIMM FOX

## Corporate IT Will Feel More Heat in Terror Battle ...

CORPORATIONS will feel more pressure to re-examine IT security and privacy policies and procedures now that Washington is calling for new measures to fight terrorism.

Yet most companies don't have chief security officers who have both the IT skills and law enforcement training to guide management through the legal and technical issues stemming from government acquisition and analysis of private data and communications.

John J. Davis, president of John J. Davis & Associates Inc., a New York-based IT management search firm, says financial services and health care companies have senior-level IT security executives because of government mandates, but most industries don't. "After Sept. 11, this issue is on the front burner," he says.

Transportation, education and pharmaceutical companies will need expertise to deal with new government requests and civil liberties concerns.

A number of the Bush administration's proposals, such as letting police obtain payment information and credit card numbers from communications companies and letting law enforcement agencies tap into e-mail and Internet connections, can be justified by the government's immediate need to protect against terrorism. But companies will have to weigh privacy and security concerns with customers against government demands.

Michael Berezik, who served as deputy assistant secretary of the Treasury under President Clinton and is now national director of the privacy practice at PricewaterhouseCoopers, said the events of Sept. 11 show that companies must have policies on how to compile, store and release information in response to government requests. This includes technology to process personal data and stated privacy policies for that data.

Current law allows information gathered from grand jury subpoenas, such as computer records, financial transactions and telephone calls, to be shared among domestic law enforcement organi-



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One Giant Step for Marketing

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zations. A new proposal would permit this information to be shared with intelligence-gathering organizations such as the CIA. Triggers that permit customers to opt in or out of transactions that may be shared with these organizations aren't well defined. For instance, will a car rental customer have to sign a waiver on a standard rental agreement granting government access to information?

Companies must also be able to protect themselves in case private information is inadvertently leaked or disclosed by the government.

The administration is creating a new Cabinet-level agency for homeland security to boost our defenses. Corporate executives should do something similar. In a new Jupiter Media Metrix study (completed before Sept. 11) about spending priorities for major Internet business projects within the next six months, 56% of the 471 respondents ranked security first.

To many ways, we're playing catch-up with our nation's security. Having chief security and privacy officers can help companies catch up as well. ■

DAVID MOSCHELLA

## ... And Can Emerge With Higher Image

OVER THE PAST FEW YEARS, the public image of the IT industry has deteriorated sharply. Having witnessed the false alarms over Y2K, the burst of the dot-com bubble, the decline of the Nasdaq, the telecom industry bust, the rising numbers of layoffs, frequent software viruses and the less-than-admirable behavior of Microsoft during its antitrust trial, many Americans have come to view our business with a sense of wariness and suspicion. The contrast with the late 1990s is amazing.



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Similarly, there is now a distinct lack of recognized and respected IT industry statesmen, especially since Andy Grove retired. While Bill Gates, Larry Ellison, Scott McNeely, Jeff Bezos and John Chambers remain highly visible, they still seem somewhat boyish and are primarily associated with tirelessly promoting their own companies. The

only other really prominent figure, Lou Gerstner, would seem to have the necessary gravitas, but he tends to avoid the wider public spotlight. In the wake of the Sept. 11 tragedy, it's time for our industry to begin to more positively reassert itself. The reality is that IT has never been more

essential than it is right now, and our industry leaders have an opportunity and obligation to serve as best they can. When one looks at the challenges ahead in the long war against terrorism, it's clear that IT will play an important role.

It's now clear that the past few weeks have forever reconfirmed the value of cell phones, e-mail, videoconferencing, telecommuting, disaster-recovery services and robust, multifunctional Web sites. All these technologies greatly increase society's ability to function during a crisis, and all look much more urgent than they did just a few weeks ago. It shouldn't be too difficult for our industry to reassure America of the resiliency of its information infrastructure without sounding too eager and opportunistic.

But there's another set of emerging technology applications that is considerably more controversial. As our country becomes more aware of its many points of vulnerability, there have been calls for significant new forms of government intervention. National ID cards, facial-recognition systems, expanded wiretaps, e-mail monitoring, credit card tracing, international data sharing, spy satellites and improved scanners are among the many high-tech proposals being floated.

### IDs Stir Passions

REQUIRING people to carry a national ID to prove they aren't criminals is a violation of the Constitution ("Ellison Offers Free Software for National ID," *Computerworld*, Sept. 24). America isn't a police state and shouldn't become one because of this terrorist act.

**Larry Johnson**  
Engineer  
Tempe, Ariz.

IT IS POSSIBLE to have a national ID card without central repositories that would compromise individual privacy ("White House Nixes National ID Notion," *Computerworld*, Sept. 27). You could add a magnetic stripe to driver's licenses with a digital signature that shows the card was issued by the appropriate authority, that proves information on the card hasn't been altered and that could aid

In verifying that the cardholder matches the picture. Such a card is a closed system; no database of citizen information need be maintained, since information on the card is compared only to itself and to the person holding the card.

**J.B. Fields**  
Technical writer  
JB Fields & Associates LLC  
Washington

**Editor's note:** Join our online discussion forum about whether the U.S. should implement a national ID card system at [www.computerworld.com/q/a040](http://www.computerworld.com/q/a040).

### The Costs of IS

AS MUCH AS I appreciate the story ("TIS Is An Secure As Other Web Servers, Claims Microsoft," *News*, Oct. 11), it was nothing more than a rehash of what most knowledgeable Internet security people have

These new and often unproven security technologies raise a number of difficult cultural and philosophical questions. Broadly speaking, our industry has historically taken a strong (if somewhat self-serving) libertarian stance. It has generally resisted export controls, e-mail monitoring, online privacy regulation and other forms of political intrusion. At times, it has been outright dismissive of the government's security concerns.

In this, it has had significant public support. However, public opinion on security issues has changed radically, at least temporarily. Consequently, many IT industry leaders might soon have to decide how strongly to support or resist expanded government powers. The country will expect our industry to successfully and gracefully manage the inevitable conflicts between patriotism, business opportunities and its pre-Sept. 11 sense of idealism.

The work of our industry certainly isn't as heroic as fighting in the field, rebuilding New York or preparing for the next terrorist attack, but IT can make an important contribution. Let's hope that if that time comes, our leaders can muster the necessary consensus, resolve and higher sense of purpose. ■

## READERS' LETTERS

been aware of since the release of Windows '9x servers. The biggest problem is that Microsoft responds to brochures only after the damage has been done, which ends up costing far more than simply migrating to alternative platforms.

**Paul Gereaux**  
IT consultant  
NewDown Productions  
Portland, Ore.  
[pgareaux@quest.net](mailto:pgareaux@quest.net)

A USER IS QUOTED as saying that the Apache Web server is harder to set up than IIS. I use Caldera Linux and have the Webmin package to help with the configuration and maintenance of Apache. I've found it simple to use, even when managing other systems processes and users.

**Scott Wolf**  
Memphis

OUR COMPANY IS on the midst of a large project us-

ing Windows 2000 Server and IIS. We now spend 40% to 50% of our time trying to shore up IIS and block worms and viruses. There are still people who remember spending 80% of their time developing business solutions and 20% or less of their time on systems administration.

**Ben Whitman**  
Consultant  
Communities Online Inc.  
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# IP convergence

## solutions in practice

technical overview

This Technical Overview looks at the practical issues involved in the migration towards integrated IP networks carrying multimedia traffic.

**Part 1** examines the context in which enterprise networks are evolving towards widespread deployment of IP, and the factors driving convergence.

**Part 2** discusses the future of IP networking, and the benefits that convergence will bring, in the form of new integrated applications and extended access to corporate resources.

**Part 3** addresses some practical issues which the Network Manager needs to address in moving towards full IP convergence while minimizing risk and disruption. It considers two possible scenarios to illustrate how solutions from Cable & Wireless are specifically designed to simplify and facilitate the migration.

### Key topics

- IP telephony
- real-time IP
- budgetary convergence
- Intranets
- virtual private networking
- 'click to call'
- unified messaging



CABLE & WIRELESS





# Contents

<b>1 Background — drivers for change</b>	<b>2</b>
What's typically in place now	2
In the local area	
In the wide area	
New pressures on the network	3
Challenges faced by IT staff	4
Evolution in service delivery	4
The trend towards virtual private networking	4
A new generation of VPNs	4
<b>2 The new enterprise network</b>	<b>5</b>
Steps towards the converged network	5
Establishing an IP-VPN	
Bringing voice onto the IP network	
Benefits of convergence	7
Economies of scale	
Reduced call charges	
Integrated applications	
Widening access	
<b>3 Solutions in practice</b>	<b>9</b>
Budgetary convergence	9
Mitigating risk	9
Auditing your current network	9
Scenario 1: change driven by data requirements	9
Phase 1 — subsidiary working	
Phase 2 — adding an IP-PBX server	
Flexibility in the LAN	
Scenario 2: change driven by voice requirements	12
Convergence in the wide area	13
Adding new applications	13
A predictable pricing model	14
Opening up new possibilities	14
Convergence as an enabler for e-Business	15
Cable & Wireless: Delivering the Internet promise	15
<b>4 Index</b>	<b>16</b>

# 1 Background — drivers for change

Section 1 outlines the context in which enterprise networks are evolving towards widespread deployment of IP and eventual convergence.

## What's typically in place now

### In the local area

Figure 1 illustrates a typical configuration at a single location, with voice and data carried over separate infrastructures and covered by separate budgets for equipment, cabling, management and maintenance. This generally consists of:

- An Ethernet data LAN, carrying IP and legacy traffic between PCs. Connections typically use Category 3 (Cat-3) or Cat-5 cabling.
- A PBX for switching voice traffic between extensions and outside lines, with telephones on the desktop and dedicated cabling.

### In the wide area

Figure 2 shows what organisations typically have in place for inter-site communications. As in the LAN, voice and data communications are usually covered by separate budgets. The typical wide area enterprise network might include:

- A corporate data network based on frame relay, ATM, private circuits or a combination, with IP (intranet) and legacy traffic carried over links with requirements for a committed data throughput. Different classes of service (CoS) may be available to support particular applications — for example, an ATM constant bit rate (CBR) service for real-time applications such as video.

### The irresistible rise of Internet technology

In a recent survey of the Network Managers of 251 major corporations, 91% reported that IP is now the predominant protocol on their corporate network, or **intranet**. More than 35% of these communicate with other organisations via an **extranet** — a group of intercommunicating intranets, with access restrictions to isolate it from the wider Internet.

There is also a significant move towards **virtual private solutions**. Overall, 42% of businesses in the UK, and 47% in the Netherlands, now see IP-VPNs as the future. This figure rises to over 70% among law firms — a sector which by definition insists on the highest levels of data security. This positive attitude reflects growing confidence in IP as a secure, proven technology.

Figure 1. The pre-convergence LAN

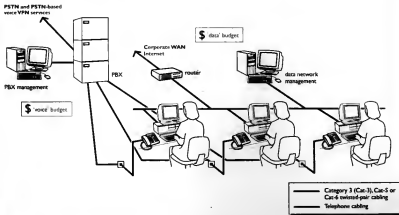
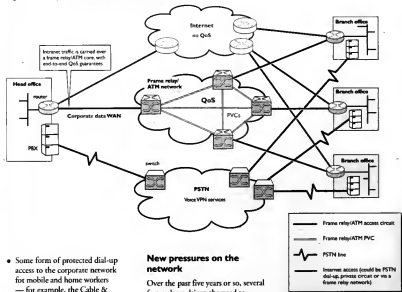


Figure 2. The pre-convergence enterprise network



- Some form of protected dial-up access to the corporate network for mobile and home workers — for example, the Cable & Wireless SecureDial service.
- Internet access, with a publicly available web site for e-trading, marketing, etc. With an extranet, authorised users outside the enterprise may be granted access to parts of the intranet via Internet connections.
- PSTN lines for voice calls. For intra-company voice traffic, many organisations use a managed public network-based service like Cable & Wireless Global Intelligent Virtual Network, which provides a short-code Dial Plan between sites, and incurs lower call charges than standard PSTN services.

#### New pressures on the network

Over the past five years or so, several factors have driven the need to upgrade communications and computing infrastructures.

- With more processing power on the desktop, users are running more (and more complex) applications, placing heavier demands on the network.
- Available bandwidth within the LAN has increased in response to changes in the type and volume of traffic and the need for resilience. Increasingly, users have 100 Mbit/s connections to the desktop, and some now have Gigabit Ethernet.
- The 'desktop' is no longer geographically fixed — staff need the flexibility to access the corporate network while traveling or working from home, and to share desks in the office when necessary.

I Background — drivers for change

### Challenges faced by IT staff

The technical difficulties faced by IT staff are compounded by radical and rapid changes in the business environment.

- Globalization means they must deal with more widely dispersed locations, working across national boundaries.
- With mergers, acquisitions and reorganizations, sites often need to be added to or removed from the network at short notice, and provided with the ability to communicate directly with one another in a meshed network.
- Applications also need to be added, modified and removed as business requirements change.
- Web pages are becoming more complex, expanding from simple text and graphics to interactive multimedia applications which support e-Business.

### Evolution in service delivery

The 'traditional' corporate data network was based on private circuits, with fixed bandwidth between fixed locations. Now that neither bandwidth requirements nor locations are fixed, this arrangement lacks the necessary flexibility and scalability.

Circuit-switched networks have largely been replaced by packet- and cell-switched technologies such as frame relay and ATM, with virtual connections sharing bandwidth by statistical multiplexing. This allows for a more efficient and cost-effective use of bandwidth, especially for the bursty traffic carried over data networks.

Most of these technologies remain connection-oriented, however, with specified locations linked by permanent virtual circuits (PVCs). Adding new sites to an enterprise network still involves the provisioning of new PVCs and reconfiguring equipment, and access bandwidth is a limiting factor.

The next step is to dispense with circuits altogether, and use connectionless technology such as IP. Users, sites and devices can be added to or removed from an IP-based enterprise network at any time, by simply validating user IDs and passwords. An IP network is, by definition, meshed — a single, straightforward connection to a public network Point of Presence (PoP) gives any-to-any connectivity, with no need to worry about configuring virtual circuits to share access bandwidth.

### The trend towards virtual private networking

As the enterprise network becomes more inclusive and wide-reaching, the challenge of day-to-day management can be a distraction from the strategic planning and innovation necessary for continuous competitiveness.

Businesses are increasingly turning away from fully 'private' networking solutions, and relying on operators like Cable & Wireless to supply and manage their infrastructure, allowing them to:

- reduce capital investment and management overheads
- concentrate their own resources on developing and supporting applications
- benefit from the performance, reliability and capacity of a public

network, and the expertise and around-the-clock availability of specialist staff

- be confident that future upgrade paths are built into the solution, thus mitigating technical risks

This is the **virtual private network (VPN)** — a solution providing secure transport of private traffic across public network infrastructure, with **Service Level Agreements (SLAs)** defining availability and performance. IP-compatible VPNs are known as IP-VPNs.

### A new generation of VPNs

IP was not originally considered to be appropriate for running business-critical applications over an enterprise network, because it could not deliver guaranteed QoS, and security was a major concern.

With the development of Multi-protocol Label Switching (MPLS), VPNs can now be configured across public IP networks with the necessary QoS guarantees for different traffic types, including realtime voice and video. For more information about MPLS, see the box on page 7.

As for security, with MPLS plus firewalls and encryption techniques, IP-VPNs can be made as secure as the fully 'private' alternative, with the added advantage of providing easier and more flexible control over users' access to specific information.

## 2 The new enterprise network

Section 2 looks into the future of IP networking, and at the benefits that convergence will bring.

### Steps towards the converged network

Figures 3 and 4 show how a typical enterprise network might evolve towards convergence.

### Establishing an IP-VPN

One possible starting point is to replace the existing WAN infrastructure with an IP-VPN, using MPLS to provide consistent, guaranteed QoS.

This new network will be flexible and scalable, so that new users, sites or applications can be added and integrated whenever necessary.

Bandwidth is plentiful at the core, and can be added to access circuits with no need for major reconfiguration.

Migration won't happen overnight — in most cases, the IP-VPN will need to be integrated with existing infrastructure (e.g. ATM) for some time. An advantage of MPLS in this respect is that it is a *multi-protocol* technology — the label-switched paths which are routed through an MPLS system can be switched by ATM switches as well as by IP routers, allowing IP traffic to be carried across an ATM core.

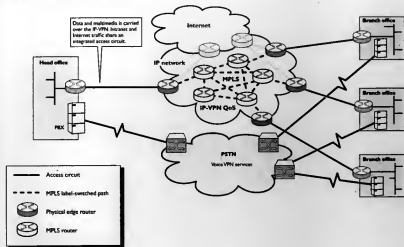
### Categories of cabling

The unshielded twisted pair cabling (UTP) used in LANs is categorized under the EIA/TIA-568 standard, according to the data transmission speeds supported, as follows:

- Category 3 (Cat-3) — up to 10 Mbit/s
- Cat-4 — up to 16 Mbit/s
- Cat-5 — up to 100 Mbit/s
- Cat-5E — up to 1 Gbit/s
- Cat-6 (yet to be ratified) — Gigabit and beyond

\* Electronics Industry Association (USA); Telecommunications Industry Association (UK)

Figure 3. Data on the corporate IP-VPN



1 The new enterprise network

Figure 4. The converged enterprise network

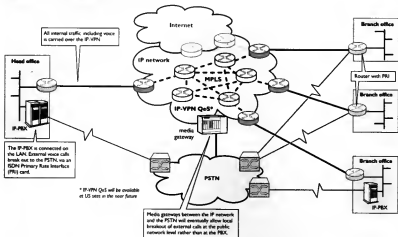
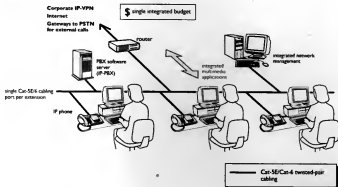


Figure 5. The converged LAN — integrated services to the desktop



### Bringing voice onto the IP network

With the IP-VPN in place, and plenty of spare capacity, internal voice traffic can be routed over it. Voice calls consume relatively little bandwidth, especially with compression techniques, and thus place very little demand on the network.

Within the converged LAN, there will be just one cabling and switching port per user, with integrated cabling (Cat-5 or Cat-6) connected to the desktop (Figure 5). Telephones have been replaced with IP phones, connected directly to the PC.

Initially, sites will retain PSTN connections for external (outside of enterprise) voice calls, which will be switched either by an IP-PBX connected on the LAN (see the box on page 8).

In the future, separate connections won't be necessary — external calls will be carried over the IP network and broken out locally onto the PSTN via media gateways.

Some existing PSTN connections can be kept as a backup resource in case of emergency.

#### Media gateways

Media gateways allow voice traffic to be passed between IP infrastructure and the PSTN, by providing conversion between the information carried on telephone circuits and the data packets carried over IP networks.

The call-control intelligence for several media gateways is handled by a media gateway controller (MGC).

Communication between gateways and MGCs uses the Media Gateway Control Protocol (MGCP), defined by the Internet Engineering Task Force (IETF).

### Benefits of convergence

Full convergence will bring together businesses' information strategies and communications strategies for the first time, resulting in cost savings and improved efficiency and flexibility.

#### Economies of scale

With voice, data and video sharing both infrastructure and equipment, the cost of ownership is greatly reduced. A single budget now covers all access lines, equipment, cabling, installation, management and maintenance.

With managed service options from Cable & Wireless, businesses can further reduce capital investment and management overheads, focusing resources on strategic planning and application development and support.

#### Reduced call charges

Intra-company voice calls may account for a significant proportion of monthly phone bills, even with the lower charges incurred using a PSTN-based voice VPN service. This particularly applies to international organizations. By routing internal calls over the IP-VPN, usage-based charges are eliminated.

For international calls outside the company, it may be possible to reduce charges by routing the call over the corporate network to the office nearest to the destination and then breaking out locally to the PSTN.

### MPLS — the key to IP-VPNs

Multi-protocol Label Switching enables the provision of secure VPNs, with guaranteed QoS, over an IP network.

With MPLS, there are no permanent virtual connections between sites. Instead, secure, logical paths are set up through the network as and when there is traffic to deliver, using the best route available at the time. This means that users, sites or devices can be added to the network at any time, without reconfiguration and without affecting security or reliability.

In technical terms, MPLS makes routers behave similarly to switches, integrating layer 2 (data link) information about network links (bandwidth, latency, utilization, etc.) with the layer 3 information in IP headers (source and destination addresses, type of service and QoS requirements).

The key feature of MPLS is the addition of a short, fixed-length label to each data packet that enters the network. The labels act as a shorthand representation of the IP headers, and are used to assign packets to label-switched paths (LSPs). High-speed routers in the core network use signaling information to determine the routing of LSPs, taking into account network conditions. In essence, these routers make switching decisions based on the headers.

## 2 The new enterprise network

### Integrated applications

With applications sharing both infrastructure and end-points, voice, data and video can be integrated to keep up with new working arrangements and business practices. Examples include:

- With **unified messaging**, users have a single inbox for voice messages, faxes, email and Short Message Service (SMS) messages from cellular phones. They can access their in-boxes from anywhere in the world, either from a telephone or via the Internet, to send and retrieve any type of message.
- 'Meeting'-type and collaborative applications, which combine audio- and videoconferencing, whiteboarding, etc. allow people to share resources and expertise whenever they need to and wherever they are.
- Currently, many organizations have both call centers and websites, but these are usually separate. Full computer-telephony integration (CTI) to the desktop will enable the development of **integrated call centers** — for example, the customer and call center agent will be able to view the same product description or demonstration on screen while talking to each other.
- 'Click to call' facilities will allow users to set up voice calls by clicking on links on websites.
- Applications like distance learning will be enhanced by the ability to embed voice links into electronic documents.
- With **multicasting**, organizations can make interactive training and information videos available to staff, who view them on their desktops rather than having to go to dedicated meeting rooms. Multicasting is also a cost-effective way of disseminating corporate messages.

### Widening access

The IP network gives users 24-hour access to information and network resources, from any location. All they need is a valid IP address and password, and a connection to the fixed or mobile public network.

Voice calls will be able to locate the recipient anywhere on the network, using the IP address.

### The IP-PBX

Unlike traditional PBXs, which require dedicated (and costly) call-processing hardware, IP-PBXs run as software applications on a network server.

IP-PBX software extends enterprise telephony functions to pocket telephony devices such as IP phones, multimedia processing devices and VoIP gateways.

IP-PBXs provide all the familiar PBX features such as hold, transfer, divert, speed dialing, conference calls, etc. Reconfigurations and upgrades are carried out through the software.

With some IP-PBXs, multiple servers can be 'clustered' and managed as a single, distributed, multi-site system, allowing capacity to be scaled up to include tens of thousands of users. Clustering also builds redundancy into the system, improving availability and reliability.

IP-PBXs may be configured automatically to divert calls to the PSTN (via an interface such as ISDN PRI) if bandwidth is not available in the WAN.



## 3 Solutions in practice

Section 3 considers how organizations might move towards full IP convergence while minimizing risk and disruption. Solutions from Cable & Wireless are specifically designed to simplify and facilitate this migration. Two hypothetical but typical scenarios are discussed.

### Budgetary convergence

While the benefits of IP convergence are not questioned, in reality organizations do not, without good reason, change what already works. Network developments will be driven by need, as the existing infrastructure becomes inadequate for supporting new applications, additional users or corporate expansion.

Any new investments in telecommunications or data networks should have IP convergence factored into them. As the network evolves, the traditional voice and data budgets will converge, freeing up resources for further innovation and the development of e-enabled business.

The way this happens will depend on individual circumstances. In practice, the process will usually be a phased transition rather than an overnight transformation.

### Mitigating risk

One reservation shared by network managers about convergence is that standards for VoIP are still in a state of flux, with no clear consensus as to which one will eventually predominate.

The H.323 standards defined by the International Telecommunications Union (ITU) represent the 'voice-oriented' approach, while Session Information Protocol (SIP), defined by the Internet Engineering Task Force (IETF) is seen as 'data-oriented'. It is probable that more than one standard will exist for the foreseeable future.

In the face of this uncertainty, any commitment to capital investment is seen as risky, and managers may wish to delay major decisions.

Managed solutions from Cable & Wireless provide low-risk migration paths, with predictable pricing models, and rental options which reduce capital investment. Built-in upgrades allow you to keep up with new developments. And because Cable & Wireless services are fully standards-based, there's no danger of becoming locked in to a proprietary solution.

### Auditing your current network

Before recommending a course of action, Cable & Wireless will work with you to evaluate your current network, your priorities and your requirements for the future, asking questions like:

- What are your voice and data traffic volumes and profiles?
- How closely will you want to integrate voice and data?
- What is your user profile? What proportion of your staff uses their PC most of the time?
- How much is your PBX costing you? You need to consider the ongoing costs in terms of upgrades to memory, software, hardware, firmware, etc., required to accommodate new users or additional traffic.
- How do you handle incoming calls? Are most of your calls

answered by an operator, or do callers dial direct to users' desktops? Or are you running a call center-type application?

- How many sites do you have? If you run a multi-site operation, how about using a centralized operator? How important is PBX-type feature transparency between sites?

### Scenario 1: change driven by data requirements

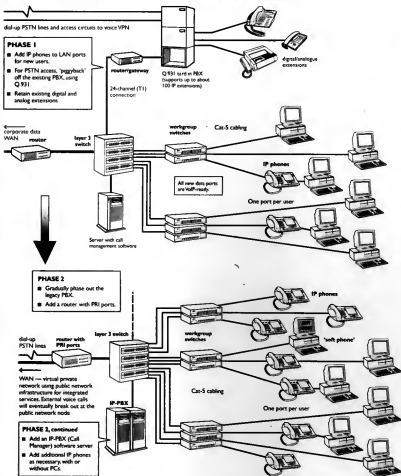
In this scenario, an organization needs to upgrade its corporate data infrastructure — for example, to roll out new applications, to accommodate new users or to migrate from SNA to IP.

As for voice traffic, the existing PBX currently meets the needs of most users. But its capacity is stretched and upgrading or replacing it would be costly. Therefore, any solution to the data requirements must include new voice capacity, with a view to eventual convergence.

Figure 6 (page 10) shows a possible phased approach, based on the Cable & Wireless IP-LAN service (see the box on page 11). Cabling is upgraded as necessary, by providing Cat-5 or Cat-6 to each desktop. All new user ports are VoIP ready, with equipment either purchased as capital, or leased on a per-port basis. A single network port for each user will cater to both voice and data needs, with significant cost savings. A layer 3 switch (see the box on page 11), which supports voice as well as data traffic, links the various network elements.

## 3 Solutions in practice

Figure 6. A transitional approach towards convergence, using Cable &amp; Wireless IP-LAN



### Phase 1 — subsidiary working

Initially, for access to the PSTN, the life of the existing PBX is extended using a form of 'piggybacking', or subsidiary working, as shown in the first part of Figure 6.

Using the ISDN Q.931 signaling standard, the PBX is linked via a specialized router or gateway to a LAN segment. IP phones are installed on the LAN for the additional users, and integrated with their PCs if required.

A single Q.931 card (which occupies a PBX extension slot) can support up to about 100 IP phones, with or without PCs.

To manage the Dial Plans for the new IP extensions, call management software is installed onto a server.

### Phase 2 — adding an IP-PBX server

Later, an IP-PBX software server is added, with IP phones on the desktop and as stand-alone units without PCs where necessary. This equipment can be a further capital purchase or an add-on to the initial managed service contract.

### Flexibility in the LAN

An IP-LAN solution is especially appropriate for organizations looking to develop more flexible working practices. Examples of IP-LAN's flexibility include:

- The ability to configure virtual LANs (VLANs), minimizing network congestion by grouping ports that exchange a lot of traffic. VLANs operate regardless of which physical port each user is connected to, so they simplify additions and changes of equipment and ports, and facilitate 'hot-desking'.
- Wireless LANs, which are ideal for touchdown areas, where users can have wireless access to the LAN without plugging their equipment into a physical port. Cable & Wireless uses Cisco Aironet 340 equipment, supplying data rates of up to 11 Mbit/s depending on conditions.

### Layer 3 switching

Switches traditionally operate at layer 2, the data link layer of the OSI model. They give off high throughput and low latency, but are limited in their scalability and flexibility, and in their support of multimedia and multicasting.

Routers operate at layer 3, the network layer, and can provide for security features and differential QoS requirements. But with their higher processing overhead they run the risk of congestion in very busy networks.

Layer 3 switches combine the speed of layer 2 switching with the intelligence of layer 3 routing. While routers carry out the processing in microprocessor-based engines, layer 3 switches use application-specific integrated circuit (ASIC) hardware to achieve much higher forwarding rates than conventional routers.

### Cable & Wireless service info

#### IP-LAN

IP-LAN is a complete, scalable LAN connectivity solution for sites with 100 or more users. It includes:

- equipment (Cisco Ethernet switches), which can be leased on a per-port basis or purchased
- design and installation services
- cabling upgrades if necessary

The three management options, all backed by SLAs, are:

- **Maintained** — equipment maintenance and upgrades
- **Monitored** — proactive fault detection
- **Managed** — the most comprehensive monitoring and management option

The **Technology Refresh** option offers regular upgrades to equipment or software, also on a price-per-port basis.

## 3 Solutions in practice

**Scenario 2: change driven by voice requirements**

In this scenario, the organization's PBX is no longer adequate, and extra voice-traffic capacity is needed. Managers are hesitant to start investing in infrastructure which may become obsolete within a couple of years.

The Cable & Wireless Convergence PBX Plus service (see the box on page 13) provides an answer, in the form of low-risk phased migration from a traditional PBX to a full IP telephony solution. The existing PBX is replaced by a managed Nortel Meridian PBX, on an initial fixed-term contract, with a mixture of standard and IP extensions. The transition to IP telephony takes place over the contract term.

Convergence PBX Plus is particularly suitable for applications which demand sophisticated PBX features such as centralized operators, audio conferencing or networked voice messaging. It also includes several options for call centers — from basic software for simple agent working, up to enhanced server-based services that support very high traffic volumes.

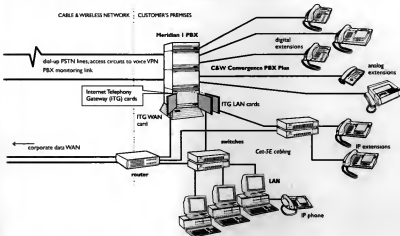
The service has advanced networking capability. Figure 7 shows how the Internet Telephony Gateway (ITG) card can be used both for connecting IP extensions within the LAN, and for interconnecting sites over the WAN, providing cost savings on intra-company calls. The Nortel signaling standard, Meridian Customer-defined Networking

(MCDN), provides feature transparency between Convergence PBX Plus sites. Sites with other PBXs can be included in the network, using Q.931 for some feature transparency.

Policy management capabilities inherent to the gateway measure the network QoS, and automatically reroute voice calls over the PSTN when necessary.

Pricing of Convergence PBX Plus is based on a simple and predictable formula — equipment, features and options are costed out on a per-extension basis. This makes it easy to budget for additional extensions as the system grows with your business.

**Figure 7. The Cable & Wireless Convergence PBX Plus approach to convergence**



#### ■ C&W service info

##### Convergence PBX Plus

This fully managed service is designed as part of a convergence strategy from a traditional PBX to a fully integrated IP-PBX platform. It is available on a rental basis only, with no capital outlay for customers.

The service is based on the industry-leading Nortel Meridian PBX range. It supports between 16 and 16,000 extensions on a single system, and includes:

- the PBX
- extension equipment
- connection (direct or indirect) to the Cable & Wireless network
- installation and configuration
- cabling where necessary
- scheduled software and hardware upgrades
- a range of options for applications such as call centers

Three options are available for each extension:

- a standard digital voice extension, with a choice of handsets
- IP migration, starting with a digital extension and allowing swap-out to a VoIP port, equipped with an IP phone, during the term of the contract
- an IP phone from day one

Figure 7 shows Convergence PBX Plus configured as a hybrid system, with a mixture of extension types.

#### Convergence in the wide area

At the same time as the LAN is upgraded, the need for extra capacity and flexibility in the wide area is met by migration to the Cable & Wireless IP-VPN QoS service (see the box below), with Class of Service options appropriate for the applications being run.

Managers can therefore concentrate on developing and delivering new applications, confident that the infrastructure exists to deliver them, backed by comprehensive SLAs. For example, the Premium service option delivers realtime IP — transport of IP packets at sub-150 ms latencies, supporting realtime traffic.

For the time being, organizations will retain public exchange lines (typically 2 Mbit/s ISDN circuits) for external voice calls, while intra-company calls will be routed over the WAN. Eventually, it should be possible for all traffic to be carried over shared access circuits, with external calls breaking out at a public network node.

#### Adding new applications

The point at which individual users' desktops are converted from standard PBX extensions to integrated IP ports will depend partly on their need for new applications.

These applications include:

- **Multicast services**, an economic way of delivering training material, corporate messages, etc. to users, who can sit at their desks and receive broadcast TV-style content.
- **Unified messaging** — Cable & Wireless can give users message boxes which receive voice, email and fax, with some ability to transfer messages between them. This allows on-the-road staff to access their email over the corporate WAN and to receive voice mail without paying international call charges.

See page 8 for more information about integrated applications.

#### ■ Cable & Wireless service info

##### IP-VPN QoS

This fully managed private network service will be available at US sites in the near future. It uses the shared Cable & Wireless IP network infrastructure to provide customers with any-to-any connectivity within a defined VPN, with an optional firewall connection to the Internet.

The service uses MPLS at the core, offering much higher QoS levels than the services delivered over the public Internet, together with a level of security equivalent to that in a fully private network.

Three prioritization levels, or Classes of Service (CoS) are available:

- **Premium** — realtime IP, for time-critical traffic such as voice and video
- **Enhanced** — for business-critical traffic such as transactions
- **Standard** — for non-critical traffic such as email

A single access link can be configured with a range of Classes of Service.

## 3 Solutions in practice

**A predictable pricing model**

With such fundamental changes taking place, managers need to feel that they have a handle on their budgets, and that costs will not spiral out of control.

Cable & Wireless uses a simple and consistent pricing structure for its managed convergence portfolio, charging for each option on a per-user basis, with management and maintenance built into the cost.

Managers can therefore plan accurately for the future, allocating resources according to the individual needs of users.

Figure 8. Simplified budgeting for current and future applications

ITEM	COST PER USER
LAN connectivity	\$X
Internet access	\$X + B
multicast services	\$X + C
standard telephony	\$Y
IP telephony	\$Z + Y
unified messaging	\$X + D
IP-VPN connectivity	\$X + E
web hosting	\$X + F
ASP services	\$X + G
TOTAL	

Future... F

**Opening up new possibilities**

A converged IP network offers enterprises more than just cost savings and new applications: in a fully IP-enabled environment, businesses can find more effective ways of communicating with customers and associates.

A key feature of Internet telephony is **Click to Call**. A user browsing a web site can click on a link to set up a simultaneous voice call using the same connection. The call can then be dynamically routed according to various criteria — the caller's location, the availability of staff to take the call, time of day, etc. As they talk, both parties can simultaneously view the same web screen shots.

Within the enterprise, **Click to Call** facilitates collaborative working and increases efficiency. And as more home users get access to high-speed Internet links, it will allow businesses to provide better service to online shoppers and people requiring customer service. The NetMeeting software that users need to set up VoIP calls is included with Microsoft Windows® 2000, and is therefore finding its way into many homes. Users' only additional requirement will be a microphone or other H.323 input device. Alternatively, some of the new generation of stand-alone web-browser phones will be H.323-compatible; and set-top boxes may soon be available, opening this capability up to the digital TV market.

### Convergence as an enabler for e-Business

The services described in this Technical Overview are fundamental components for the delivery of an e-enabled infrastructure to support e-Business. They have been designed to provide solutions based on traditional communications budgets, thus focusing the next round of IT spending on driving the upgrade of the enterprise network toward a full e-Business environment.

The delivery of end-to-end QoS and voice/data integration are facilitated by Cable & Wireless's solutions for national, regional and global requirements. They provide the foundation for other applications and services, maximising business benefits in the emerging electronic marketplace.

### Cable & Wireless: Delivering the Internet promise

Cable & Wireless delivers the Internet promise to businesses in 70 countries worldwide. With one of the fastest global Internet networks on the planet, we can help you succeed in e-Business with a full range of IP connectivity, web hosting, e-Commerce, voice and data or ISP solutions. Visit our web site for more information.

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## Contact information

For more information on business solutions and services, speak to your Cable & Wireless sales associate, or visit the Cable & Wireless web site:

<http://www.cw.com>

For more information on Cable & Wireless's Convergence Solutions, email us at [convergence@cwusa.com](mailto:convergence@cwusa.com), or visit the Cable & Wireless web site:

<http://www.cw.com/us/convergence>

Full details of the individual Cable & Wireless services described in this Technical Overview can be found on the C&W Consultants' web site:

<http://www.cw-reference.com/consult>

This includes complete Service Descriptions, briefier Service Summaries and a technical Glossary covering many terms associated with IP networking and other communications technologies.

## 4 Index

- ATM, 2, 5
- C&W Convergence PBX Plus, 13
- C&W IP-LAN, 11
- cabling, 5
- call centers, 8
- Cat-5, etc., 5
- Cisco equipment, 11
- Click to Call, 14
- connection-oriented technologies, 4
- Convergence PBX Plus, 13
- digital TV, 14
- distance learning, 8
- frame relay, 2
- 'hot-desking', 11
- H.323, 9, 14
- integrated call centers, 8
- International Telecommunications Union (ITU), 9
- Internet Engineering Task Force (IETF), 9
- Internet telephony, 14
- Internet Telephony Gateway (ITG) card, 12
- IP-LAN, 11
- IP-PBXs, 8, 11
- IP-VPN QoS service, 13
- layer 3 switching, 11
- Media Gateway Control Protocol (MGCP), 7
- media gateways, 7
- Meridian Customer-defined Networking (MCDN), 12
- Microsoft NetMeeting, 14
- multicasting, 8, 13
- Multi-protocol Label Switching (MPLS), 4-5, 7
- NetMeeting, 14
- Nortel equipment, 12
- permanent virtual circuits (PVCs), 4
- pricing model, 14
- Q.931, 11
  - feature transparency, 12
- realtime IP, 13
- Session Information Protocol (SIP), 9
- touchdown areas, 11
- unified messaging, 8, 13
- virtual LANs (VLANs), 11
- VPNs, 4
- whiteboarding, 8
- wireless LANs, 11





**Cable & Wireless**

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Cable & Wireless pursues a policy of continuous development of its products and services.

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## THIS WEEK

## LESSONS E-LEARNED

Managers like ClubCorp's Mary Kramer (above) have discovered that e-learning can cut costs and ensure more consistent training across regions. Problem is, senior management often mistakes electronic education as a replacement for invaluable face-to-face employee instruction. **PAGE 30**

## PLIGHT OF THE OVERSEAS OVERSEER

Managing an international project can be fraught with cultural nuances, unsteady technical infrastructures and other geographical differences that can delay or derail the best-laid plans. **PAGE 32**

## TRAINING TOP LEADERS

The executive education program at the Darden School at the University of Virginia is considered one of the best in the nation. Jill Vitello sat in on some classes for a closer look at what's being taught to tomorrow's top IT leaders. **PAGE 36**

## IT AT GROUND ZERO

We take a look at life for IT professionals in the days and weeks following the terrorist attacks in New York. **PAGE 44**

## BUSINESS

JOE AUER/DRIVING THE DEAL

## Winning With Leases

**L**EASING IT ASSETS OFFERS MANY ADVANTAGES. It transfers the risk of technology obsolescence from you to the lessor, conserves cash and can provide you with lots of flexibility regarding how and when you deploy or retire the assets. A successful leasing program can help you accomplish several good things, but an ill-conceived one can hit you with unnecessary cost, risk and a lack of flexibility.

Many lessors will gladly provide flexibility on the front end of the lease by allowing you to add assets over time, but they may require you to pay rent for the balance of the month or quarter in which you receive the asset. This is extra rental income for the lessor and extra cost to you, since it's accrued prior to commencing the fixed term you negotiated, which the lease says begins the next full month or quarter. This clever "gotcha" is done through some tricky, misleading contract language and is called interim rent. Look for it — and negotiate it out of your deal!

The back end of the lease also requires some focus. Most lessors' form agreements allow you to continue on only a month-to-month basis after the initial term ends, and at the original lease rate. This option does provide flexibility, but at a high cost. The original lease rate is considerably above market value because the underlying asset has depreciated and the lessor already has gotten most of its money back. In short, you're getting hosed by your lessor. To end leases on more favorable conditions, consider the following four scenarios:

The first scenario calls for return of the assets. The lease is up, and you no longer need the assets. The equipment is returned without further obligation, except for any lessee-caused damage. Remember to negotiate a maximum return-freight transportation charge (such as for more than 300 miles), otherwise, you could wind up paying coast-to-coast shipping charges. Also, make sure to get a return grace period of about 20 days after the lease ends. Sometimes, as with laptops spread across a dispersed sales organization, it can take more than a few days to round them all up.

The second scenario involves asset purchase. When purchasing from a lessor after the lease period is up, make sure you secure the right to a fair-market-value purchase. This means that you

and the lessor negotiate the price. For help in settling on a price, use an industry guide or a third-party appraisal.

The third scenario involves renegotiating the lease for an additional term, say 12 or 18 months. The renewal lease rate should be substantially lower than the original rate. The asset is worth as much as 80% less at the end of a three-year lease term, so the new lease rate should be based on the value of the equipment at the time the new rate takes effect. Anything above that is pure "lessor gravy."



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The fourth scenario gives you the right to continue the lease on a per diem basis for short-term renewals when you can't pin down the date by which you must return the equipment but you also know that you won't need it for the long term. The per diem renewal should contain two important elements. First, the per diem rate should be lower than the rate from the original lease, divided by 30. Second, you should be required to give only 30 days' notice that you're returning the equipment.

All in all, the main issue of these suggestions is that flexibility doesn't need to cost you money in leasing. Indeed, by paying attention to prelease and postlease term options, you can impact two significant factors — your money and your flexibility — in a very favorable way. ■

**A**LTHOUGH E-LEARNING has been adopted by just a handful of Fortune 1,000 companies, those that have tapped into electronic training and instruction are praising its benefits, such as rapid delivery of content, student-progress monitoring and cost savings.

But before you take the plunge, be warned: Once these benefits become tangible, senior managers frequently view e-learning as a replacement for — not an adjunct to — invaluable face-to-face employee training. Despite its benefits, e-learning is still in its nascent stages.

Corporate training is the biggest of the four e-learning market segments. (The others are the government, universities and K-12 education.) Earlier this year, Framingham, Mass.-based IDC estimated that as many as 350 companies were either marketing learning-management systems (usually server-based software), educational content or e-learning hosting services. IDC put the U.S. e-learning market at \$2.2 billion last year.

"Unfortunately, e-learning is still not as widely used as it should be," says Bryan Chapman, an analyst at Brandon-hall.com, an e-learning research firm in Sunnyvale, Calif. Although about 60% of U.S. corporations have active e-learning initiatives, "a lot of those people are just dabbling in it," he says.

#### The Costs of Higher Education

The biggest change in e-learning in the past year has been a shift toward enterprise-wide delivery of coursework, says Chapman. As a result, pricing for these systems has begun to resemble licensing fees for applications such as enterprise resource planning

systems. Rather than being charged for the number of concurrent users, customers are being charged for the total number of users — which raises the total cost of e-learning, Chapman says.

Still, despite the high cost of entrance, companies can generally expect to knock 50% to 60% off their training costs by using e-learning applications, thanks in part to reduced training time via Web-based delivery, says Chapman. In addition, the cost of off-the-shelf e-learning courses has been dropping as the base of customers has increased.

E-learning tends to befit the kind of training where content doesn't change rapidly, since it may not be feasible to continuously update teaching materials, Chapman says.

Still, barriers to the adoption of e-learning include the upfront cost of buying enterprise software and servers and the lack

of face-to-face contact. Despite those challenges, some pioneering firms have gone ahead with investments and implementations, Chapman says. That's because e-learning reduces travel costs and makes more efficient use of instructors' time, says Kathy Harris, a Gartner Inc. analyst in Charlotte, N.C.

But there are significant start-up costs for the hardware and software needed to deliver courses, provide content authoring and management capabilities, and maintain student records.

Just the infrastructure (software, servers and workstations) to get started can cost a company up to \$300,000, and that doesn't include the price of courseware, Harris says.

Such systems typically deliver lessons over a corporate intranet, although some firms plan to use the

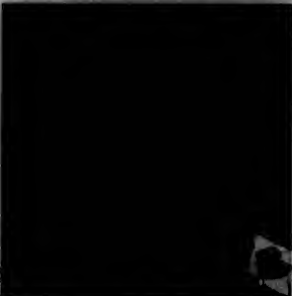
# Lessons in e-Learning

Early adopters like electronic education for its lower costs and more consistent training from one location to another, but top brass often mistake it as a replacement for invaluable face-to-face instruction. By Steve Alexander



**E-learning is not necessarily cheaper, better or more effective than other forms of training. I don't want to say it's been oversold, but I think it's been overhought.**

MARY KRAMER (SELOUT), LEARNING TECHNOLOGIES MANAGER, CLUBCORP



ClubCorp Inc., a 24,000-employee firm that runs about 200 golf courses, country clubs, professional clubs and resorts from Dallas, is using e-learning to train 15,000 remote workers now and hopes to train 5,000 by the end of the year, says Mary Kramer, the company's learning technologies manager.

ClubCorp is using e-learning software to be delivered remotely focused training, such as teaching managers how to run the employee time-keeping system.

"It's a good way to teach, although the jury is still out for us," says Kramer, who adds that the system is helping ClubCorp track which managers have received this kind of training.

"Now, it will take time before we can see if we get the employee behavior changes the training was supposed to impart," she adds. Kramer says she expects to have a better idea how effective the training has been by the end of this year.

ClubCorp spent \$250,000 for a Lotus Learning-Space learning-management system from IBM and wrote its own courseware, but that wasn't the end of its costs. Software licensing terms for the Lotus package

are currently under negotiation because IBM is moving to a more expensive named-user licensing scheme (which requires a license for every user) to replace its previous concurrent-user licensing scheme (which requires the customer to purchase licenses only for the number of people who will use the system at one time), explains Kramer.

In addition, ClubCorp discovered that it needed a part-time administrator to run the system, leading to another \$20,000 in unanticipated annual costs, she says.

## case study

While the browser-based system has worked well for a year and a half, Kramer says, e-learning isn't a silver bullet for all training. But a lot of people at the executive level want to put everything into e-learning because they've made such a large investment, she says.

Kramer's advice to other managers: E-learning isn't suitable for training that requires face-to-face interaction, such as teaching sales management skills, and it isn't necessary if there are no plans to track a student's progress.

—Steve Alexander

Internet to deliver training to employees at home.

In addition, interoperability standards for learning-management systems and their courseware are in a state of flux, which will likely slow the rate of adoption, Harris says.

Ideas about how to create universal interoperability between learning management systems and courseware are being ironed out by several interested parties, including the Aviation Industry CBT Committee, the Institute of Electrical and Electronics Engineers, the Instructional Management Systems Global Learning Consortium and the Advanced Distributed Learning Initiative of the U.S. Department of Defense. By most estimates, the standards issue won't be resolved for another year.

## Phone It In

That hasn't stopped e-learning pioneers from pushing ahead (see case study, at left), but not all companies want to run their own e-learning systems. Sitel Corp., an outsourcer of corporate call centers in Baltimore, licenses a learning-management system hosted by GeoLearning Inc. in West Des Moines, Iowa, which is both a learning-management system provider and an application service provider.

The hosted system provides Sitel with 3-D graphics designed to interest workers in e-learning; trainees can use their Web browsers to "walk around" inside a virtual version of Sitel's headquarters. The graphics tend to make students eager to take the training and help them feel like they're part of the corporation, even though they aren't being brought to headquarters for classes, according to Sheena Wilson, senior vice president of human resources at Sitel.

Since last fall, Sitel has offered e-learning to 2,000 managers; next year, it plans to roll out e-learning for call center training applications to the rest of its 24,000 employees in 20 countries.

Wilson declines to disclose the cost of Sitel's e-learning investments, but she estimates that electronic education is about one-third as expensive as face-to-face training, based on savings in travel costs, the time spent on training and the cost of printed training materials. Another benefit: consistent delivery of training worldwide.

"We are extremely satisfied with the investment that we've made and the employee response," says Wilson. ▀

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## Online Resources

For more information about e-learning, go to the following Web sites:

Integration of knowledge management and learning management from Brandon-Hall.com: [www.brandon-hall.net/infocapq/](http://www.brandon-hall.net/infocapq/)

E-learning starter kit from Brandon-Hall Inc.: [www.brandon-hall.net/infocapq/](http://www.brandon-hall.net/infocapq/)

E-learning market statistics from Times Learning Solutions Inc.: [www.learning.times.com/about/market.htm](http://www.learning.times.com/about/market.htm)

Site steps to e-learning from Brandon-Hall.com: [www.brandon-hall.net/infocapq/](http://www.brandon-hall.net/infocapq/)

**L**AST YEAR, PEOPLESUPPORT INC. was in the midst of a project to build a customer contact center in Manila when a typhoon blew out the city's power for days. But the power in the project building never blinked, because it was backed up by a generator that could last for a month.

"In Manila, the difference between being located in Building A or Building B could be the kiss of death," says Abby Hossein, CIO and senior vice president for worldwide technology at PeopleSupport, a Los Angeles-based customer service firm.

As if IT project management weren't tough enough, today's global projects are loaded with new opportunities for failure. Even veteran project managers may not realize how many additional things can go wrong when you're orchestrating an overseas effort.

The following are some things you need to do to make your global projects succeed:

#### **Facilitate Understanding**

English isn't spoken the same the world over, says Gopal Kapur, president of the Center for Project Management in San Ramon, Calif., which has provided project management training and consulting in 17 countries. Terms ranging from "PalmPilot" to "way over budget" may not translate properly in other cultures, he says. Be sure to work with fluent English speakers from non-U.S. sites to create and distribute a list of standard terms that could cause confusion, and avoid slang and idioms.

#### **Consider Cultural Nuances**

Is a deadline a "deadline" or a guideline? "Get agreement on exactly who

## **How to Ruin a Global Project**

- **Talk American;** assume that foreign team members will catch on.
- **Save time and money** by staying home.
- **Do things the U.S. way;** they'll adapt.
- **Ignore geography;** they'll adjust.
- **What infrastructure?**
- **Avoid locals;** they'll rip you off.
- **Wink at ethical questions.**
- **Ignore cultural differences.**
- **Don't fraternize with the locals.**
- **Assume technology is in sync.**
- **Plan down to the minute.**
- **Stand on principle;** never back down.

is going to hand off what to whom and when," says Johanna Rothman, president of Arlington, Mass.-based Rothman Consulting Group Inc.

#### **Be There**

Get everyone together for the project launch. "It's expensive and it takes time, but if you take a shortcut here, it will be a 'long cut' in the end," says Leslie Janove, principal at Janove Associates, a consulting firm in Half Moon Bay, Calif., that has expertise in organizational effectiveness for global IT projects. If most of the team is based outside of the U.S., hold the launch elsewhere, says Rothman.

Even if time and money are tight, meet with every person on the team at least once every few months — and more often, if possible. "Face to face, you take in a lot of information you can't take over the phone," Rothman says. Try notice, for example,

whether or not staffers are subject to interruptions and competing priorities or lacking essential tools or services, she says.

#### **Be Aware**

Holidays, labor laws, working hours, standards of measurement and even paper sizes differ around the world, says Kapur. In Europe, for instance, technology products must be approved by the Geneva-based International Organization for Standardization, whose requirements are different from those of Northbrook, Ill.-based Underwriters Laboratories Inc.

Pay attention to geography. "People just don't understand that when it's morning here, it's night in India," Kapur says. Hang world maps with team locations noted and set up clocks with New York time, Delhi time and Tokyo time.

"The physical presence of those items can be very important," he says. Kapur rotates phone meetings by time zones so everyone shares equally in the discomfort of off-hours calls.

Try to accommodate team members by going into work early to talk to Europe or staying late to talk to Asia, says Rothman, but don't try to do both. You'll run out of steam, and everyone will suffer.

#### **Do Your Homework**

Because Hossein's team picked the right building in Manila, his project stayed up while most of the city's power went down. Also, investigate regional telecommunications infrastructures, he says. Learn who the suppliers are, what kind of bandwidth the country has and how well it's connected to the Internet.

# Projects Across International IT and business project skills and cultural know-how



"In lots of countries, the entire telecom infrastructure comes out of one building," Hossein says. "What happens if that building goes down?"

Also, be sure to investigate how frequently and for what duration telecommunications systems are typically disrupted in different regions and if secondary providers are available.

#### Leverage Locals

"Local people understand how things work in the country," Hossein says. "They have contacts we can use, like a connection in an embassy to get a visa."

Local resellers and subcontractors of global vendors are often more responsive than the vendors themselves, he

says. "If we wanted to borrow equipment on a trial basis or have inventory drop-shipped or have a vendor keep some hardware for us, the resellers [are] much hungrier and more responsive," he says. "They can move mountains and get things done much faster than [U.S.-based] account reps."

#### Draw the Line

In countries like China, counterfeits software is the norm. In Mexico, bribes are a part of everyday business.

"In lots of countries, if you don't use bribes, things don't happen," says Rochelle Furtah, a consultant at Janco Associates who teaches classes for the Project Management Certification Program at the University of California-Davis extension service. As the project manager, you have to draw the line and understand the consequences, she says.

#### Acknowledge Differences

Teams work best when they understand the cultural differences among members, Furtah says.

For example, Americans like to challenge one another, while Japanese people never put anyone on the spot. Her team members complete cultural and workstyle questionnaires to get at their differences and then talk about them at the project kickoff.

Leveraging differences creates "positive stress" that fosters innovation, she says. For example, the stress for each person trying to "sell" his approach to a problem leads him to examine the benefits of his own approach as well as the approach of others' more closely. Leaving differences unacknowledged can create negative stress that impedes performance.

#### Synchronize Your Tools

Make sure that everyone has the same hardware and software — including versions and patches — as well as training and support, says Furtah. It may seem like a no-brainer, but different versions or patches can, and often do, cause havoc. "That's the weakest link when you're spread out over the globe," Furtah says.

#### Build in Some Slack

"Project managers misjudge how long it will take to do something in another country," says Hossein, who waited a month to get a telephone switch shipped from Denver to Manila.

"It takes orders of magnitude longer, whether it's due to customs holding equipment or vendors not responding or your just not knowing the lay of the land," he says. "It's important to anticipate delays and buffer your schedule."

#### Compromise

Sometimes you have to stand on principle. Sometimes you have to get the project done. And occasionally, the two are mutually exclusive.

When Furtah was program manager for a global project at a shipping company in Asia, some of the Asian team members refused to take direction from a woman. "I decided not to fight and instead to leverage my team by sending over a male project manager who had worked and lived in those cultures," she says. "It was a trade-off, but we got the project done."

**Quick Link**

For a related story about how culturally diverse clients and employees can be easily misconnected, go to [www.computerworld.com/12329](http://www.computerworld.com/12329)

# Cross the Pond

Projects call for sharp communications now. By Kathleen Melymuka

Opportunity no longer knows  
these days. It darts past the  
before you can even react.

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# The Next IT Strategy: The Information Utility

*The Internet is already changing the way in which companies buy and maintain IT, says one expert*

In this month's issue of the Harvard Business Review, John Hagel III and John Seely Brown posit that your next IT strategy will be about buying IT as services over the Internet rather than owning and maintaining your own hardware and software.

"It's not just a vision," Hagel says. "Large corporations are implementing this."

Hagel and Brown are chief strategy officer and chief innovation officer, respectively, at 12 Entrepreneuring Inc., an operating company that nurtures IT innovation.

Hagel, formerly leader of the e-commerce practice at New York-based McKinsey & Co., recently spoke with Computerworld's Kathleen Melymuka from his San Francisco office.

**Q: You compare a traditional corporate application with a Swiss Army Knife. What do you mean?**

**A:** Historically, connections across applications were so expensive and so difficult to create that people ended up with applications that were massive in scope because they didn't want to have to connect them.

[Application developers] tried to imagine every task that might need to be accomplished and design them all in. So you end up with something like a Swiss Army Knife that can do most things but can do nothing extremely well.

**Q: Why is a Web-enabled process better?**

**A:** It allows much more easy and cost-effective connections across applications or technology resources so you can get access to the best-in-class applications, wherever they reside, in a much more flexible way.

**Q: You point out that the Web services infrastructure is still maturing, but are there ways companies can benefit today?**

**A:** Yes. One of the most attractive features of Web services architecture is

that it provides a set of tools to take existing legacy applications and node-enable them, creating a front end on the application that will allow other applications to access the resources for specific needs.

General Motors has taken this approach to solve the very difficult challenge of connecting its own applications to those of more than 8,000 North American auto dealers — a task that would have been virtually impossible using traditional architecture.

[GM and its partners] keep their existing systems in place, establish much more flexible connections across applications and now have a much more efficient way of serving customers.

**Q: You also advise companies to start "at the edge."**

**A:** That's the notion of focusing attention on activity where there is frequently interaction with multiple business partners.

At one end, there's procurement and, alternatively, the sales and customer support function. Those are the areas [of] most immediate value because they involve the need to interact with independent entities with very different technical platforms.

**Q: Most of the cases you discuss in the article are about reducing costs. Do you see other uses?**

**A:** Definitely. Given the current economic environment, the most powerful motivation will be cost reduction, but in the longer term, Web services architecture creates enormous potential for business growth.

For example, in mergers and acquisitions, the difficulty in integrating IT

systems has been one of most significant challenges to achieving intended value. Web services architecture can play a role in making that an easier, quicker and lower-cost process.

It also provides the opportunity to take resources within the company and make them available as revenue-generating services to other companies. Citibank took a major payment-processing engine they had developed for their own business and offered it as a Web service to a series of electronic markets.

**Q: How will this Web evolution affect the staffing and management of IT departments?**

**A:** It will have a dramatic effect. A whole set of skills around network technology and architectural approaches needs to be developed or recruited into IT departments.

And those skills need to be more effectively integrated with traditional enterprise skills [because] you're connecting a new architecture with previous generations of technology. It will be much easier over time to outsource key aspects of [internal] IT operations, so you also will need to deepen those management skills.

On the flip side, there are opportunities to offer services developed internally to generate revenues, so you'll need those skills.

**Q: You say Web services will ultimately turn companies inside out. What do you mean by that?**

**A:** Today, boundaries are very clearly defined, and the company usually ends at its firewall.

Web services architecture will create an environment where companies will

be able to access resources wherever they reside — in whatever enterprise. Resources that previously existed outside the firewall and were difficult to access will become easy, and those that were tightly locked in will be more accessible to other enterprises as well.

The question will be, What is an enterprise in this new world?

This is the fourth in a series of monthly discussions with authors of articles in the HARVARD BUSINESS REVIEW on topics of interest to IT managers.



"A WHOLE SET OF skills around network technology and architectural approaches needs to be developed or recruited into IT departments," says 12 Entrepreneuring's John Hagel III.

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ad that was mocking one of the company's other ads.

# Training IT's Top Leaders

IN A HUMID SUMMER Tuesday evening, a charter bus pulls to a stop at the University of Virginia's Rotunda and Pavilions at the Academic Village, built by

Thomas Jefferson 125 years ago. The people who disembark aren't tourists, despite their casual clothes, sensible walking shoes and the cameras slung around their necks. They are the 53 members of the 2001 class of The Executive Program (TEP), a six-week intensive executive summer camp at the Darden Graduate School of Business Administration at the University of Virginia in Charlottesville.

Computerworld decided to take a look at what's being offered at Darden, which is considered by IT executives to be one of the premier executive education programs for current and future IT leaders.

This year's TEP participants come from 13 countries and represent 17 industries. Two-thirds of the students are from outside the U.S. Four are current IT managers.

The members of the TEP class hail from different cultural heritages, religions and races, but they share many important traits. They are achievers—the high-potential managers within their companies, which are paying the hefty tab for their attendance. They're mostly in their 40s, successful in their various professions, ambitious and smart. Most are here on the advice of

**IT EXECUTIVES** participating in Darden's executive education program, from the left panel: Don Burns (foreground) of New Zealand's Island Revenue department, Louise Van Der Bank of Iscor Ltd., Noel Hiney of the Bank of Ireland and Andy Miller of Boeing Space and Communications.

**A LOOK INSIDE THE EXECUTIVE EDUCATION PROGRAM AT DARDEN**  
BY JILL VITIELLO



TEP graduates who have made it into the executive ranks.

"My boss attended TEP a couple of years ago and came back a different person," says Don Burns, an IT manager responsible for application development and support at New Zealand's Inland Revenue department in Wellington. "He was more strategic, less focused on the nit-picky, willing to delegate and able to lead the team more effectively."

Now it's Burns' turn for radical change in his own career — and he says he's ready for it. He's leading a 75-member team that's converting the New Zealand equivalent of the IRS from Cobol programming to e-business platforms.

"I feel privileged to be here," says Burns, a 30-year veteran of Inland Revenue. "I hope to come away from the course a better leader and to achieve a more holistic view of work and life. I am using this time at Darden to think about how I've done things before and learn new ways to lead."

Darden offers a wide variety of executive education courses, but TEP is the jewel in its crown. Participants whose companies sponsor their attendance at TEP know that they are on the fast track to the executive suite.

In 2001, the price tag for the program was \$32,000. Companies must guarantee that employees who attend will be relieved of their regular work responsibilities so that participants can focus completely on the rigorous

curriculum and demanding schedule.

Noel Hiney, a 21-year veteran of the Bank of Ireland, is the fifth employee the bank has sent to TEP. When Hiney enrolled in the program, he was director of external relations for the Bank of Ireland's e-business area, responsible for "external and customer-facing e-business." His 35-member team developed the bank's main Web site and pioneered Internet payment applications there. (When he returned from TEP, Hiney was put in charge of leading a new business initiative.)

"We come to the U.S. to get a different perspective," says Hiney. "You just can't best the experience of being immersed in the U.S. culture and learning the American management style. The great thing about TEP, however, is that it also provides valuable insight into other global cultures via case studies and participant interaction. I learned about the business and management practices of the U.S. and many other countries."

Hiney and other participants point out that not only is TEP a chance for them to grow as executives, but their weeks-long absence also gives their staff members the chance to make decisions and manage the work on their own, which is a great development opportunity for them.

### Mind and Body

Wednesday morning begins with a brisk aerobics workout in the North Grounds Recreation Center. Almost all

of the TEP participants are there at 6 a.m. Darden's emphasis on developing the whole person includes voluntary medical screenings and a personalized health plan that's put into practice from Day 1 at TEP.

Andy Miller is one IT executive who has committed himself to the wellness program.

"They say it takes three weeks to lock in a new habit," says Miller, director of computing and network operations at Boeing Space and Communications, a division of The Boeing Co., in Seal Beach, Calif. "There is a difference between knowing what I should do and doing it. I hope to build better habits for taking care of myself by eating right and putting exercise into my daily routine."

"The point of the health plan is to raise the executives' awareness of fitness and to make time for it in their schedules, not just to help them lose a few pounds while they are here," says Lou Centina, senior director of executive education at Darden.

"Darden's goal is to make TEP a transforming experience for those who attend," he says. "We touch all dimensions of the individual. Intellectual, by building functional skills and helping them to become effective leaders; physical, by learning to value their health; interpersonal, by working in teams; emotional, by dealing with ambiguity and realizing that it is good to be passionate about your purpose; and spiritual, by examining core values and beliefs as they apply to the workplace. These themes are woven throughout the program to challenge people in ways they hadn't anticipated."

After a quick — and light — breakfast in Sponsors Hall, where TEP participants and faculty dine together, Miller and his well-exercised colleagues climb the hill to Saunders Hall, where classes are held.

Saunders Hall's domed atrium, pale yellow walls, polished wood floors and custom-made rugs in hues of blue and gold are reminiscent of the university's Rotunda.

In a comfortable, well-appointed classroom, TEP participants assemble to hear professor Alec Horniman deliver a lecture entitled "An Ethical Values Perspective." Horniman presents scenarios that require the students to make decisions about behavior and actions based on their own ethical standards. The class discussion produces good-natured laughs as well as serious contemplation.

"I earned my MBA degree 16 years ago, but the world has changed a lot



### MAKING THE MOST OF AN EXECUTIVE EDUCATION PROGRAM

Here are some suggestions from TEP participants on how to wring every drop of experience out of an executive summer camp:

**Participate.** "Participate in everything. Take advantage of the wellness program, join in the informal soccer games, play tennis, be a part of the conventions in the classroom, complete the assignments, read the case studies, do all the activities that are offered."

— Don Burns

**Reflect.** "We get so much material in one day that I try to reflect daily on what I can take out of this experience and how I can implement what I've learned."

— Louise Van Der BEEK

**Interact.** "I'm learning from the other 17 folks here how business is done in their countries. They face the same IT issues, so I'm studying their best practices. I view my interaction with my colleagues here as one of the most effective things I can do to learn about international business and IT matters."

— Andy Miller

### THE 2002 PROGRAM

As we prepared to go to press, Computerworld learned that Darden has decided to streamline TEP from a six-week to a four-week program.

Says Steven Allen, associate dean of Darden's executive education program: "TEP will have the same name, energy, spirit and rich content as it had in its first 45 years. In response to requests from companies that want their managers and executives to attend TEP but can't afford to have them gone for six weeks, Darden has decided to go to the new shorter format."

■ Cost: \$25,500

■ Dates: Begins June 3, 2002

■ Class size: Between 30 and 60

■ Ratio of U.S. to international participants this year: 1 to 2

■ Average age of participants: 42

■ Countries represented in this year's class: Argentina, China, France, Ireland, Japan, New Zealand, Norway, Saudi Arabia, South Africa, Sweden, Switzerland, the U.K. and the U.S.





THE EXECUTIVE PROGRAM at the Darden Graduate School of Business Administration at the University of Virginia bombards students with course work in finance, accounting, marketing, sales, forecasting, logistics, supply chain, human resources, ethics and more.

## Training It's Top Leaders

since then," Miller says. "I want to become stronger in the quantitative aspects of business. However, the part of my job that fascinates me is developing people, learning new aspects of leadership and bringing about change."

Next, professor Bob Cooney presents a session on "Growth, Capital Structure & Cost of Capital."

After that, professor Mark Parry leads a multimedia session on "Expanding the Meaning of a Brand."

"Future CIOs don't need more training in technology, and they don't need more courses in project management. They need this leadership training," says Brandt Allen, associate dean of Darden's executive education program, whose own background includes teaching at Harvard University and working

at IBM as a consultant to CIOs.

Allen contends that CIOs have notoriously short tenures in that position because they're not properly prepared to be executives. While most have adequate IT experience, few have a strategic understanding of all of the aspects of running a business.

Darden seeks to change that for all TEP participants — no matter which executive track they're on — by bombarding them with course work in finance, accounting, marketing, sales, forecasting, logistics, supply chain, human resources, ethics and more.

For the remainder of the day, the TEP participants do their homework, reading the case studies assigned for the next day's lectures.

"Darden's program is based on three learning experiences: individual study, teamwork and class participation," says Louise Van Der Bank, the divisional manager of IT at Iscor Ltd., a metals company, in Vanderbijlpark, South Africa. "To make sure I get the most from my Darden experience, I need to be sure that I get the [most] out of each. That's why I spend time reading and reviewing the course material. I need to understand the points so that I

can contribute in class and to my team and learn from them."

In the evening, the group gathers for dinner at Sponsors Hall. Afterward, many end up at the Pub, a recreation room where they engage in friendly but fierce games of billiards and ping-pong. The lone TV sits idle and dark.

### A Wise Exercise

On Thursday morning, professor Dick Brownlee meets with the TEP participants in Saunders Hall to prepare them for Wise, a computer-based exercise in multinational corporate management.

In the Wise simulation, the students act as members of general management teams, running hypothetical companies for several quarters.

The class is divided into small teams representing competing companies. The teams must complete a series of tasks and make operating decisions by specific deadlines.

The group that runs its company most profitably and successfully will be declared the winner of the Wise simulation.

Van Der Bank says she's looking forward to the Wise project. She has just been tapped as Is-

cor's first female general manager. When she returns from Darden, she'll be running a steel mill in Pretoria.

"I've been responsible for continuous improvement, revising business processes and driving change," says Van Der Bank. "From Darden, I want to learn how to extend the value chain, improve interaction with suppliers and customers, and support globalization through IT."

Like many in this year's TEP class, Van Der Bank and Iscor colleague Erich Heine are legacy students.

"Iscom's CEO has been through the Darden training, and this gives us a good common language and understanding," says Van Der Bank.

### Working Day and Night

The Wise teams work day and night starting Thursday afternoon. At first, they work quietly in their breakout rooms in Sponsors Hall.

By Friday evening, a few of them are pacing the brick walkway outside of Sponsors Hall, smoking cigarettes and arguing. Others stand toe-to-toe in the corridor, negotiating terms of ad hoc agreements.

After dinner, Miller returns to the breakout room. He settles in front of the computer and heaves a sigh. Burns looks up and smiles sympathetically.

Down the hall, Van Der Bank reconvenes with her group, sips from her water bottle and flips through a binder of papers.

The Wise teams settle in for a long night — a familiar feeling the IT professionals know well.

"This is a privilege for me," says Miller, who explains that he chose Darden over Harvard, Duke University and other business schools for several reasons. "The content of the courses appealed to me, the highly rated faculty was a draw, and the international emphasis is important to me in my work for Boeing," he says.

During the following four weeks, the TEP participants will continue to work hard and experience all the program offers, including a trip to Washington to meet government officials — a facet of the program particularly prized by the foreign students.

In the sixth week, the students' spouses and children can join them for activities such as a private visit to Monticello, Thomas Jefferson's home.

After that, they return to their homes and jobs, uniquely prepared for the chance to lead. ■

Vitellio is a freelance writer in East Brunswick, N.J.

"FUTURE CIOs don't need more training in technology. . . . They need this leadership training," says Darden associate dean Brandt Allen.



# Downsizing Made Gentle

## WHO IS HE?

**Lawrence Stuenkel** is the founder of outplacement firm Lawrence and Allen. He advises managers to handle layoffs with compassion — but still protect the company.

*As the economy skitters, layoffs abound. IT professionals are in a hard spot on either side of a layoff.*

IT managers doing the firing have to handle the unenviable task well or risk potential hacking or other forms of electronic destruction by angry former employees.

On the flip side, IT professionals who are let go face a difficult job search along with the nearly 1 million other victims of layoffs in the U.S. since January.

Outplacement professional Lawrence Stuenkel advocates "friendly" downsizing, where managers handle layoffs with respect and compassion — but still protect the company. One reason: When things pick up, you may want to rehire those very same workers.

Stuenkel, founder of Greenville, S.C.-based Lawrence and Allen Inc., also says that laid-off high-tech workers often make some critical mistakes when they're looking for new jobs. He explained how to avoid these mistakes in an interview with Computerworld's Kim S. Nash.

**Where do IT people who have been let go tell down in their job searches? We find a great willingness to use buzz-phrases and acronyms. They are very nice at telling us the systems, the environment, the software, the**

hardware. What I really want to know is the results of what you did — that the results either directly or indirectly impacted revenue, cut costs or both. If you installed SAP [software] on time and on budget, how is the company better?

**How long does it take to find a good IT job in this market, when many companies simply aren't hiring?** One thing that is not true is that it will take one month for every \$10,000 in income. That's an old wives' tale. The length of a campaign is affected by so many variables: skill sets, perceived age, income, industry to which the individual is applying, time of the year. The jobs are out there, but the interview cycle always is slower in the summertime. Some of the key decision-makers that the IT people want to have involved in the interview process are at Disneyland.

**What do you mean by "perceived age"?**

There is still age discrimination. And there are some people who interview in a very energetic manner, which would suggest that they are not as old. They interview with strength, vitality, conviction. There are others who project a much older age.

**What about job-hunting on the Internet?**

Fewer than 2% of people get their jobs through the Internet, even IT people. We have clients who will tell us they've had a good day job-hunting because they've responded to 20 or 30 Web postings. But they never hear anything. It's a waste of time.

What we find is, in this market, the Internet is so big that the returns on using it aren't good. If you're going to use the Internet to your search, I would do it after 7 in the evening. During the day, use your time to make personal contacts and calls.

**OK, now you're a manager downsizing your staff. What goes wrong there?**

You want to have a soft or friendly downsizing as much as possible because it's going to affect the people who remain. They want the assurance that they will be treated with respect and that the separation wasn't a knee-jerk reaction to some mandate to cut costs by 10%. [And you should] do a good job softening the experience because the people you separate today may be the same ones you want to hire next year.

**Some managers try to hide impending layoffs from employees until the day the ax falls. You say they should be honest all along. We did a downsizing a couple of months ago, and people said, "Why wasn't management honest with us [before the layoffs]?" We know shipments going out aren't as great as they used to be. Our overtime is gone. We have inventory buildup."**

If companies always kept it truthful, they would have great credibility.

In business schools, you're always taught how to increase everything. When you have to go in reverse, no one knows how to do it.

A lot of companies gather big

groups in the cafeteria or shipping area and [layoff] announcements are made. That's just a situation that leads to chaos. You have a group you can't control, and it's very impersonal.

If it's a very large downsizing, do it in small groups or one-on-one. But don't bring everyone in; you won't be heard over the din of discussion.

The best downsizings get an outplacement firm involved in the planning [so it can] understand the company culture.

**Companies lay off workers to save money. But hiring an outplacement firm costs money. How much do you charge?**

A good firm can save a company [the equivalent of its] fees just in reducing unemployment compensation. If you have a good firm that guides the company to avoid lawsuits, you're just buying insurance that's invaluable.

We don't charge for upfront consulting. We want the downsizing to go smoothly and to minimize problems. Our fees are based on how many people are going to be out-placed and how long the company wants our services.

**So, how much does it cost?** One-on-one counseling will be \$1,500 to \$3,500 for an individual in a one-month program. Groups are on a per-day basis. Additional services are typing and printing of résumés, critiquing of letters, generation of a database of employers. That's usually part of the planning process [with the company], and that is in the discussion of fees. »

**Quick Links**

Do you have a hard-harsh story or advice to layoff IT workers? If so, go to our discussion forum: [www.computerworld.com/go/2001](http://www.computerworld.com/go/2001)

The people you [lay off] today may be the same ones you want to hire next year.

LAWRENCE STUENKEL, FOUNDER,  
LAWRENCE AND ALLEN





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# "Dear Career Adviser:

*I'm a software engineer in Santa Clara, Calif., who is working at a small company that has laid off half its workers. From 60 people, we became 30 and may shortly reduce to 18, possibly excluding me. What happens to my health insurance?*

## Dear David:

You could be out of luck if the company folds, but otherwise, you will most likely qualify to continue to receive coverage on your former employ-

er's plan through COBRA. The condition is that your company must have 20 or more full- or part-time employees as of your termination date.

If there are fewer than 20

employees remaining, then you'll most likely continue your health benefits under Cal-COBRA, which was instituted in 1996, says George Chobany, a Monterey, Calif.-

based insurance specialist. Similar programs exist in other states.

Be prepared for sticker shock, says Chobany, since you must pay these premiums yourself, adding 2% to your employer's cost for COBRA and 10% for Cal-COBRA extension coverage. If you exhaust your COBRA or Cal-COBRA benefits, then you will most likely continue your health insurance under the Health Insurance Portability and Accountability Act of 1996 (HIPAA).

HIPAA guarantees that peo-



**PAUL SMITH** is an expert in high-tech careers and recruitment. Send questions to [Paul@compuserve.com](mailto:Paul@compuserve.com) or [Paul@compuserve.com](mailto:Paul@compuserve.com).

ple who have had continuous health coverage without a gap of more than 63 days can't be denied insurance, even if they have a pre-existing condition. While it offers help in moving from one group coverage plan to another, or from group to individual coverage, it offers no protection if you switch

from one individual health plan to another.

Chobany advises comparison-shopping for individual policies, which might be cheaper, and also says you should note any serious pre-

## WORKSTYLES

# IT at Ground Zero: The New York Red Cross

The magnitude of the World Trade Center attack on Sept. 11 has nearly overwhelmed the processes and systems in place at the Greater New York chapter of the American National Red Cross.

As of Saturday, Sept. 22, the chapter had opened 14 shelter housing 371 displaced residents. The agency had also served more than 1 million meals, conducted 6,280 counseling sessions, responded to 67,122 calls to the Red Cross hot line, deployed 64 emergency response vehicles and distributed 16,575 "comfort kits" containing basic supplies for displaced people. In addition, the Red Cross had processed thousands of volunteers to help with disaster relief. In response, IT staff and volunteers have been working around the clock to strengthen the IT infrastructure, boost connectivity, establish hot sites, take inventory of and

install new donated equipment, and capture and manage incoming data on potential volunteers and victims of the disaster.

Leslie Hunt, CIO of the New York chapter, spoke with contributing writer Leslie J. Goff about how IT is supporting the ongoing disaster relief.

**Number of IT volunteers since the Sept. 11 attack:** Right now [Sept. 24], we have about 12, including people from EDS, Cisco, AT&T, EMC, plus volunteer project managers and people who have volunteered with us before.

**What's IT's role after a disaster?** We support the ongoing case management of all the services we provide: family services, shelter, mental health services. All the data collected on our clients is captured on paper, and we have been overwhelmed by that.

**What has IT been doing since the attack?** We are trying to maintain normal user support, plus the additional support needed because of the disaster. Red Cross national has set up operations in Brooklyn, and we've helped them get all the data they need. All the [IT] vendors [including EMC Corp., Dell Computer Corp., Compaq Computer Corp. and Cisco Systems Inc.] have made

generous donations and are helping us with our immediate IT needs, like stabilizing our network, setting up redundant sites and upgrading to a 100Base-T network with a gigabit backbone.

We also created an Access database that followed the volunteer forms people were filling out, and we've had volunteers from Webgirls [the New York chapter of professional association Webgirls International Inc.] helping key all that data in. We've had thousands of people fill out the volunteer forms. It's an unbelievable amount of paper.

So we're functioning on a number of different levels, and the support we have got-

ten from the IT community has been humbling. We asked for help, and they have responded, and we are so grateful. We're trying to come up with a long-term IT plan — we have to make sure that whatever [donated] systems we put in, we can continue to afford to support them. A lot of what we get done is just through sheer willpower, because almost all of our money goes to our clients. What goes to operations is very thin.

**What has the atmosphere been like?** Everybody was shocked, but my role is to make sure they are all OK. I got them all to talk to our mental health therapists. We've tried to maintain normalcy in a very chaotic environment, and if people are frustrated scared, anxious, that's OK; it's normal.

**Workday:** That has become kind of a joke. Normally, we're an 8-to-5 kind of office. But now, we're putting in 18- to 20-hour days. Our short-term memories are shot. My first day off was Saturday, [Sept. 22], I went to the mall to get my son a birthday pre-



## American Red Cross

Type of business: Humanitarian

Main location: New York

Number of IT employees: 12 staffers, supported now by dozens of volunteers

Interviewer: Leslie Hunt, CIO

existing conditions in your own or your family's health history before you exit your current employer. This is important if you require Medicare coverage later on.

#### Dear Career Adviser:

*I have an IT background and am thinking of enrolling in a master's degree program in computer science, but I'm not sure which direction to focus on. I had thought about networking or e-commerce. With the recent slowdown in the economy, I feel uncertain about spending money on an expensive degree or certification that won't prove useful.*

— SPECIFICS, PLEASE

#### Dear Specifics:

Over time, getting that advanced degree is still a great move. However, right now, making specific predictions

sent, and I couldn't remember where I parked my car. I was ecstatic to get some rest.

**How has building security changed?** We're doing more than usual, as a precaution. Security is searching bags and having people turn off their cell phones and beepers before they enter the building. Everyone, even volunteers, has to have a photo ID badge and sign in and out.

**Were you a Red Cross volunteer before joining as CEO?** No, and I didn't realize it until I took the position, but my mother had been a Red Cross nurse in World War II. When she died, my sister found letters she'd written during the war, and a bunch of old Red Cross posters. So it was almost as if, without knowing it, this was where I was supposed to be.

**Leslie Jaye Goff is a freelance writer in New York and author of the recently published book Get Your IT Career in Gear: Practical Advice for Building a Career in Information Technology (2001, McGraw-Hill/Osborne Media, Berkeley, Calif.). Contact her at lgoff@ix.netcom.com.**

is extremely difficult, because we were already in an economic slowdown before the events of Sept. 11 and we've been in a holding pattern since then, says Dmitri Boylan, president of HotJobs.com Ltd. in New York.

Considering that the job market has gone from hot to not, Boylan suggests

looking at trends to predict future growth.

"Look at the number of [baby] boomers and others who shifted away from jobs in government and education, as well as at the number of boomers now retiring," he says. Although it's too early to forecast

exactly which specific technical areas will prove long-lasting, Boylan expects hiring to expand at federal, municipal and state levels, as well as in education. Current hot application areas are obvious: security, surveillance and disaster recovery. For others, you'll have to wait and see. ▀



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## THIS WEEK

## MORE THAN FIVE 9s

Nothing less than 100% reliability is acceptable for the world's largest payment processing system, says Richard L. Knight, a senior VP at Invoant, the Visa subsidiary that runs its data centers. **PAGE 40**

## FUTURE WATCH

Eight IT watchers look ahead five to 10 years and tell us what we can expect, what we may not see and what they think researchers are neglecting. **PAGE 54**

## QUICKSTUDY

Microprocessors — chips made up of millions of transistors and other elements organized into specific functional operating units — are at the heart of modern computing. Find out more in this week's primer. **PAGE 56**

## SECURITY JOURNAL

Getting a new security position approved is easy, compared with wading through résumés, conducting interviews and keeping out hackers who pose as job candidates. **PAGE 60**

## EMERGING COMPANIES

Tripp's channel management software helps suppliers with catalog and order management in addition to connecting them to procurement exchanges. **PAGE 62**

NICHOLAS PETRELEY

## Ontology and the Web

**T**HE GIST OF LAST WEEK'S COLUMN was that the disorganization of information on the Web is at the heart of the growing pains we're experiencing in the Internet economy. As I mentioned last week, a *Scientific American* article, "The Semantic Web," by Tim Berners-Lee, James Hendler and Ora Lassila ([www.sciam.com/2001/0501issue/0501berniers-lee.html](http://www.sciam.com/2001/0501issue/0501berniers-lee.html)), proposes a way to make that information more accessible, which would empower programmers to build more intelligent software.

The goal of the Semantic Web's supporters is to make it possible for software to find the data it needs on the Web, understand it, cross-reference it and apply it to a particular task. The means to this end are a combination of XML, Resource Description Framework (RDF) and a concept called ontologies.

Assuming that everyone publishes data on the Web in conformance with the standards, I should be able to tell my Web-enabled handheld device to schedule no appointment with a dentist within 20 miles of home and let the computer do the rest. It should be able to interact with the data on the Web to find a doctor who belongs to my insurance plan, resolve schedule conflicts, make the appointment at both ends and compile driving directions to get there.

Think of the Semantic Web as a project to deploy workflow management and enterprise resource planning software on a global scale, except in this case, there's no single authority over the various departments where the data is kept. On second thought, don't think of it that way; it would probably spoil your next meal.

Obviously, I'm not optimistic. If you read last week's column, or any of my other columns dealing with XML, you should know that I'm deeply unimpressed with XML as an enabling technology for sharing information. I'm not at odds with the authors of the aforementioned *Scientific American* article on this point. The article itself points out that XML alone is inadequate for the job. XML is great as a standard way of saying, "This next thing is a widget." But XML doesn't require that you describe what the widget does, how it works or that the widget itself conforms to a standard.

RDF helps this situation a little. RDF is a complementary standard designed to describe the widget in terms of a subject, predicate and object. If I'm in danger of losing you at this point because you've forgotten your grammar lessons, don't worry, we're not going there. If you're curious about the details, visit [www.w3.org/RDF](http://www.w3.org/RDF).

Otherwise, think of it this way: When XML points to a series of digits, RDF makes it easier for your computer to figure out that this

is the phone number it should dial. Unfortunately, if one Web site uses the tag "cell" and another uses "mobile," RDF doesn't do anything to help your computer understand that they're basically the same.

That's where ontologies come in. Ontologies are Web pages that contain a mystical unifying force that gives differing labels common meaning, even when crossing international language boundaries. We empower these pages by holding hands during each vernal equinox while we sing "Kumbaya."

If astute readers detect a note of sarcasm, I plead guilty. It's not that the concept is unsound. It's just that there's this thing about human nature: Give folks a loose standard and the first thing many of them do is exploit its weaknesses for their personal gain. And as standards go, used-car salesmen register higher on the strictness-meter than XML and RDF, never mind this nebulous concept of ontological Web pages.

People thought nothing of repeating a word hundreds of times in HTML metatags to trick dumb search engines into giving them more prominence in the early days of the Web. The Semantic Web doesn't change the fact that these same people manage sites that will compete for your dollars.

Don't get me wrong. I love the idea. For one thing, the Semantic Web describes a world where computer automation isn't an oxymoron. Given the processing power at our disposal, it's criminal that today's users should know what disk drives are and are required to recognize an executable e-mail attachment in order to avoid a Trojan horse or virus.

The other thing I like about the Semantic Web is that if you step back and get a holistic perspective of the whole thing, you'll see that it's really a distributed, text-based object-oriented relational database management system (OODBMS). No kidding. Have a look at the specs, and you'll find objects, properties, methods, inheritance, relational hierarchies — the whole enchilada. And I'm a big fan of OODBMS technology. All I want to know is how you motivate millions of database administrators to play by the rules, loosely defined or otherwise. ▶



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ONE OF THE LARGEST FINANCIAL SYSTEMS in the world is hidden in a nondescript building near Washington. The owner, Visa International Inc., hasn't put its name on the building, nor will it allow a reporter to say exactly where it is. The secret data center is a fireproof, earthquakeproof concrete fortress with 5,000-pound doors and a basement full of backup gear, but it has fake windows to make it look like any of hundreds of ordinary office buildings in the area.

Paranoia? Not when you consider the stakes. Five minutes of downtime in Visa's worldwide processing system, called VisaNet, would block \$55 million in payment transactions, estimates the Foster City, Calif.-based firm.

"There is no such thing as 99.9% reliability; it has to be 100%," says Richard L. Knight, senior vice president for operations at Inovat Inc., the Visa subsidiary that runs its data centers. "Anything less than 100%, and I'm looking for a job." The company has had 90 minutes of downtime in 12 years.

Visa fights the battle against outages and defects on two broad fronts: Its physical processing plant is protected by multiple layers of redundancy and backups, and the company's IT shop has raised software testing to a fine art.

There are more than 1 billion Visa payment cards outstanding around the world, spawning \$2 trillion in transactions per year for 23 million merchants and automated teller machines and Visa's 21,000 member financial institutions.

"We run the biggest payments engine in the world," says Sara Garrison, senior vice president for systems development at Visa U.S.A. Inc. in Foster City, Calif. "If you took all the traffic on all the stock markets in the world in 24 hours, we do that on a coffee break. And our capacity grows at 20% to 30% year to year, so every three years, our capacity doubles."

Visa has four major processing centers to handle that load, but the Washington facility is the largest, with half of all global payment transactions flowing through the building. It shares U.S. traffic with a center in San Mateo, Calif., but it can instantly pick up the full U.S. load if San Mateo goes down.

Indeed, everything in Visa's processing infrastructure — from entire data centers to computers, individual processors and communications switches — has a backup. Even the backups have backups. For example, the Washington center has four rotating uninterruptible power supply (UPS) units (only three are needed) driven by the local utility and backed up by an array of batteries and four 1-megawatt diesel-powered generators. The 24,000 gallons of diesel fuel stored on-site is enough to power the center for a week. The UPS units protect the center from possible power fluctuations. The facility has enough redundant cooling capacity to air-condition 300 homes.

"Visa understood early on that things like triple redundancy and scalability would be the critical, defining factors in a highly competitive landscape," says Randi Purchia, research director at AMR Research Inc. in Boston. "They realized that they are a technology company; it is their business."

The eight IBM mainframes at the Washington data center are rated collectively at 3,000 MIPS. Altogether, worldwide, 7,000 MIPS of processing power can



Visa provides extreme protection for the world's largest payment-processing system. By Gary H. Anthes

# When Five 9s AREN'T ENOUGH

## Change Control

Visa makes 2,500 system changes per month and modifies 2 million lines of code annually, yet it has essentially no downtime in its worldwide payment-processing systems. How is that possible?

"We spend a lot of time on change management," says Anthony LaManna, vice president for operations and network services at Invoant. Visa recently completed a three-year overhaul of its 25-year-old, assembler-language-based clearing application, which processes 50 million to 100 million transactions each night to settle accounts among merchants and banks. In addition to unit and systems testing of the new C code by the development staff, 50 people in two quality assurance groups put the software through its paces.

One quality assurance group tested 600,000 transactions, carefully selected from production data to represent each of 50 types of services. The other group ran full-scale tests using five days of production data - at 70 million transactions per day - and then compared the results with actual runs for those days.

Visa also conducted user-acceptance testing among a sample of member banks, as well as life cycle testing in which 3,000 composite transactions (for example, a charge plus a later adjustment) were tracked over a seven-day period. About 45% of the entire project was devoted to these efforts, says Joel Miller, Visa's senior vice president for strategic projects. "We added almost a year to the schedule when we realized the complexity of the testing," he says.

Scrutiny of the new software didn't end when it went into production, says Richard L. Knight, senior vice president for operations at Invoant. A command center was set up for 30 days and staffed around the clock with senior technical people able to respond to problems. And the firm set up a help desk for customers who had problems with their own software, which had to be modified to interface with Visa's new system.

Each of the 2,500 system changes is assigned one of four risk ratings, with Level IV being the lowest risk and Level I the highest, Knight says. He reviews those ratings and if and routinely disapproves or reschedules any for which he feels the risk to system uptime is too great. And he insists that changes be designed in such a way that they can be made or reversed in less than an hour, if necessary.

Employer attitudes toward quality at Visa may be the biggest success factor, says Rendi Purchia at AMR Research. "Pride in what they do pervades the entire organization. They've engineered that across divisions and down into incentive systems," she says.

"The most important thing is the people," Knight agrees. "They know what I second of downtime means."

—Gary H. Anthes

conduct 10,000 payment-authorization transactions per second. Visa's network, one of the largest private networks in the world, consists of 9 million miles of copper and optical fiber, and every Visa customer has two paths into Visa via commercial carriers.

Every operations area at the data center is equipped with a blue light mounted high on a wall. The lights flash when the San Mateo center is down and the Washington facility has picked up the entire U.S. processing load. The lights are a warning to workers not to take any action that might escalate the outage.

"If the light comes on, everyone gets off the floor," says Anthony LaManna, vice president for operations and network services at Invoant. "They go get a cup of coffee or something."

While all these backups and safeguards contribute to Visa's ultrareliable operations, they're only part of the story. Every summer, well in advance of its year-end peak processing season, Visa runs a full-scale stress test at IBM's \$1 billion Performance & Scalability Center in Gaithersburg, Md., where IBM has 14,000 MIPS of processing power. The tests cap

months of requirements analysis, modeling and testing at Visa's own facilities.

"We introduce failures at that point as well," says Mike Wolfson, senior vice president of engineering at Invoant. "So while we are processing 5,000 messages a second, we'll knock off a storage controller and make sure the system doesn't skip a beat."

This kind of full-volume testing - which Visa doesn't have the capacity to do in-house - has proved itself, Wolfson says. Several applications that ran flawlessly in production at peak loads failed when the test load was increased to reflect volumes projected for the coming holiday season, he says.

And Visa tests more than the impact of higher volumes at the IBM center. New software is tested as well, says Mike McGraw, vice president of systems engineering at Invoant (see related story at left).

"These [legacy] applications have, for the most part, been written in IBM assembler," he says. "But now, with the use of C and C++, we have to see how that's going to behave. You can do all the modeling in the world, but unless you push it to its limit, you won't find out where things break." ▀

## Credit Card Authorization Flow

- 1 The cardholder presents the Visa card (credit or debit) at the point of sale.
- 2 The merchant uses an electronic terminal or the telephone to request an authorization from the merchant bank.
- 3 The merchant bank creates a VisaNet integrated payment authorization request message that includes details about the account and the transaction. This message is then switched through VisaNet to the card issuer.
- 4 The issuer reviews the request and makes a decision to approve or decline it.
- 5 The issuer's response is sent back through VisaNet to the merchant in a matter of seconds.



NOTE: In some cases, when an issuer is unavailable for authorization, VisaNet will authorize the transaction as a part of a stand-by processing service. This is done to further enhance payment system efficiency.

SOURCE: INVOANT INC.

## Inside the Secret Center

Visa's Washington-area processing center houses 50 million lines of code for some 300 applications. Major functions include the following:

► **Authorization system.** This online, IBM-mainframe-based system propels a payment card request from a cardholder to a merchant, to the merchant bank, then on to the card issuer and back to the merchant.

► **Clearing and settlement system.** This mainframe batch system nightly and settles accounts among merchants, merchants' banks and card issuers.

► **Fraud-detection system.** This online system runs on Sun Microsystems Inc. servers and uses neural networks and pattern-recognition algorithms to look for fraud in each payment transaction.

► **Data warehouse.** This mammoth storage facility consists of 16 Storage Technology Corp. tapes and a 250,000-volume tape library holding up to seven years' worth of transaction histories. It grows by 250TB each month.

**When you left the office last night, you  
enterprise**





worked for a Midwest-based humming nicely along with ten accounts.



**When you walked in this morning,**



you were greeted by an e-mail announcing that you just landed a new piece of business—which happens to be bigger than those same ten accounts combined.

What's at the top of today's to-do list? Figure out how to expand your supply chain and create distribution channels to service all of your client's retail locations around the world. And could you do it by tomorrow, thank you?

Hopefully you've got an infrastructure that's built on technology that works around your needs, not the other way around. It should be standards-based, so you're limiting your risk. Adaptable, so you can quickly adjust to change. Reliable, so you're up and running without a hitch.

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Infrastructure: it starts with you.



## TECHNOLOGY VISIONARIES

## Scope the FUTURE

**V**IDEO GAMES THAT TRANSCEND Hollywood movies and play roles in education and literature, golf balls with embedded tracking systems, computers that understand spoken language with 100% accuracy. What technological developments can we expect in five or 10 years? What's cool, but unlikely to arrive that soon? And what are we neglecting? Freelance writer **Matthew Schwartz** recently interviewed IT watchers Ed Colligan, Michael Dertouzos, Gerry Kaufhold, Jakob Nielsen, Donald Norman, Jef Raskin, John Thackara, and Carl Yankowski to get their prognostications.

**What is one big-impact technology or concept you think will happen in the next five to 10 years?**

**Colligan:** We will have devices that will be wafer-thin, have high performance, always-on access to the Internet, and sport beautiful, 24-bit color screens where we can receive real-time audio and video virtually anywhere.

**Yankowski:** Mobile videoconferencing from a handheld computer.

**Norman:** The role of games and simulations together [is] going to be very powerful, and [they] are therefore going to play a role transcending Hollywood movies and moving into other areas, such as education and literature. People seldom take computer games seriously, but games are starting to reach a form of richness that approaches literature and movies.

**Holmes:** Big, high-resolution monitors. IBM has already released a 3,800- by 2,600-pixel monitor with a resolution of 200 pixels per inch. This model supposedly costs around \$20,000, but as with all hardware technology, prices can be expected to drop substantially with mass manufacturing. I would expect to see

monitors with around 4,000 by 3,000 pixels at a 300 dpi resolution and a price below \$1,000 in 10 years. With pleasant high-resolution screens, we may finally start seeing the death of paper.

**Raskin:** Head-mounted or eyeglass-mounted displays. There are two size-limiting factors in making a product both usable and small: input and output. We don't have any really good solutions to the input problem that don't require excessive training to use, but even the thinnest cell phone could have computer-screen resolution and be able to browse ordinary Web sites with a head-mounted display. The early adopters will get a lot of ribbing [for wearing those displays], but we'll soon get used to seeing people wearing them.

**Kaufhold:** I believe that nobody is going to want to carry any extra equipment on their person. So the cell phone gets a small color LCD screen and a smart-card reader and uses Bluetooth or 802.11b to wirelessly communicate with nearby services. The

cell phone also works as a normal cell phone for voice communications. When you stop for gas, it pays at the pump, all based on a smart card plugged into a cell phone. When you plug the smart card into a "heavy" client like a computer, the broadband network uses the information on the smart card to go find your preferred desktop look and feel and also connects you to all your current data files.

**Dertouzos:** Without question, it's spoken-language understanding and dialogue. I mean that as opposed to dictating a very long stream and having the computer understand it. It's a natural, human way of communication. The progress has been very spectacular and continues to be, and we are at a level now where the understanding is high — 97% [accuracy] — if the context is narrow.

I expect it to be used primarily in the business transactions of retail goods [and] catalog-buying. You can call a store and ask, "Do you sell woolen sweaters sized XXXL?" So they'll answer your query. And I expect it in obtaining government information, such as these numbers you call to get tax forms.

**What one new technology would be really cool but is perhaps unlikely over the same period?**

**Yankowski:** A new technology that would be extremely cool but is unlikely to happen would be the ultimate wireless home network. It would have to be low cost, easy to install, truly interactive and have clear and adhered-to standards for audio, video, PCs and other appliances and devices.

**Norman:** My favorite is speech understanding. A lot of people would say we're going to have it next year. We already have systems that are pretty good... but understanding words is the easy part. Understanding language is the hard part, and we don't know how to do language.



We have the possibility for major advancement, and it's stymied now by political and business arguments.

CARL YANKOWSKI, CEO,  
PALM INC.

**Colligan:** A golf ball with an embedded tracking system, so I know exactly how far I am from the pin using [Global Positioning System] technology and so I never have to lose another ball again.

**Nielsen:** In the software realm, it would be very good to get protective operating systems that would guard users' time and direct them to the best resources while shielding them from information overload. However, this is unlikely to happen within 10 years because it would require the computer to have a higher degree of understanding and situational awareness than we are likely to get. Twenty years are another matter, though. Eventually, computers will take the role of a good secretary and protect their users.

**Raskin:** The ideal input device, probably just beyond our present technology and science, would be a non-invasive, direct mind-to-computer communication device to bypass the use of our muscles as input devices. We'd get speed, ease of use, and it would be a tremendous boon to many people who have physical disabilities that keep them from using computers efficiently.

**Thacker:** Collaborative health. The health machine does four things: diagnosis, monitoring, treatment, prevention. But the missing link is collaboration. We need to be co-creators of our own wellness and health. To a degree, such a transformation is already under way: The collaborative evaluation of health information on the Web changes power and knowledge relationships to a stunning degree. But... I fear the institutional inertia of the medical professions, drug companies and governments may well prove too much for Net-enabled collaboration, however obviously good the idea may be.

**Detrouzon:** The ascent to meaning. Currently, we're dealing with computers that are very syntactic, low-level; we have to specify exactly what we want, and when we search, we really have to search literally for what we are looking. Now imagine computers making a small jump in their ability to comprehend what you're saying, first a little, then a lot better. While you can't achieve perfection in computers recognizing everything we ask, we can certainly move way the hell above where we are now.

**Are we going to miss the boat on some killer technology that should be attainable?**

**Yankowich:** Yes, I think the retail market is missing the boat on the e-wallet. In five to 10 years, we could have a truly secure, pervasive e-wallet, with credit cards; bank accounts; identification including driver's license, passport, corporate ID and security cards; electronic keys; and much more. It's going to take years to set up the infrastructure to handle this. **Norman:** The real ball that is going to drop is in the political domain rather than the technical domain. For example, there will be decisions about intellectual property, cryptography and standards.

For instance, look at our cell phones. They're more expensive and less reliable than those in Europe, and we have competing systems and competing standards because of the fight between local carriers, long distance and satellite companies. We have the possibility for major advancement, and it's stymied now by political and business arguments, though mostly political.

**Nielsen:** Right now, user interfaces assume that all actions are free because you own the computer and have paid for all the software.

In the future, many more aspects of computing will have a price tag attached, often in terms of real money. Software may be rented over the Net, and content may require a micropayment. All links aren't created equal. Some will cost a nickel, and others will cost a dime. And one may be rated very highly on an independent reputation-management service. Lots of questions, but nobody is working on these problems.

**Raskin:** We're definitely missing the boat on interface design. There's nothing wrong with 30-year-old technology, like today's [graphical user interface], so long as it works. But nothing jinks us more than the gross annoyances visited on us by Microsoft's Windows. Word and other present system- and application-level interfaces. We know how to fix them, but it will take most of the next decade to get around the corporate inertia that keeps us mired in the bad old ways.

**Thacker:** I'd say e-learning is ready to implode. Fantasies of a technological fix for education are highly attractive to some politicians. They dream of a vast, semiautomated learning machine. They are beguiled by talk of an "emerging electronic university," a "uni-

fied global marketplace for ideas," "anytime, anywhere learning," and "Web-based knowledge exchanges." Most of the e-learning pure-plays went bust, as they richly deserved to do.

**Kaufhold:** The real changes that need to be looked at are not technology, but how do the business models, government agencies and social groups figure out how to make the world a better place, when we have more technology than we actually need?

**Detrouzon:** I don't see any such thing now that looks promising and people have put aside. As I look at the key areas — nanotechnology, biogenomic semantics, speech, speech meaning, automation, robotics, genomics and the link between genomics and computer science, and ability to link the structures of the genome and biological processes with computing — we are putting, I think, a lot of resources into all of them. Perhaps you might say that the time has come for us to try and build a gigantic, distributed brain, where we build pieces of it at various universities around the world. But we don't know enough to do that, so we would have to go in there blind. But things can come out of left field, like the World Wide Web. You've got to leave an opening. ■

*Schwartz is a freelance writer in Arlington, Mass. Contact him at Matja@PensandCamera.com.*

## Who's Who



**Ed Colligan:** Founder and chief operating officer, Handspring Inc., Mountain View, Calif.



**Michael Detrouzon:** Late director of the Laboratory for Computer Science at MIT (Died Aug. 27)



**Gerry Kaufhold:** Principal multimedia analyst, Cahners In-Stat Group, Newton, Mass.



**Jakob Nielsen:** Principal and co-founder, Nielsen Norman Group, Fremont, Calif.



**Donald Norman:** Principal and co-founder, Nielsen Norman Group



**Jef Raskin:** Author of *The Humane Interface* and creator of the Apple Macintosh



**John Thacker:** Director and first Perceptics, Doors of Perception, Amsterdam



**Carl Yankowich:** CEO, Palm Inc., Santa Clara, Calif.

# Inside a Microprocessor

BY TOM THOMPSON

**T**HE MICROPROCESSORS in today's computers have grown tremendously in performance, capabilities and complexity over the past decade. Clock speed has skyrocketed, and size has dwindled, even as the number of transistors packed on them has soared. A processor from 1983 made do with 30,000 transistors, while some current CPUs have upwards of 40 million transistors.

Any computer program consists of many instructions for operating on data. A processor executes the program through four operating stages: fetch, decode, execute and retire for completion.

The fetch stage reads a program's instructions and any needed data into the processor.

The decode stage determines the purpose of the instruction and passes it to the appropriate hardware element.

The execution stage is where that hardware element, now freshly fed with an instruction and data, carries out the instruction. This might be an add, bit-shift, floating-point multiply or vector operation.

The retire stage takes the results of the execution stage and places them into other processor registers or the computer's main memory. For example, the result of an add operation might be stored in memory for later use.

An important part of a microprocessor is its built-in clock, which determines the maximum speed at which other units can operate and helps synchronize related operations. Clock speed is measured in megahertz and, increasingly, gigahertz. Today's fastest commercial processors operate at 2 GHz, or 2 billion clock cycles per second. Some hobbyists speed it up to practice calling

## DEFINITION

A **microprocessor** is the heart of a modern computer, a chip made up of millions of transistors and other elements organized into specific functional operating units, including arithmetic units, cache memory and memory management, predictive logic and data movement.

overclocking) to get more performance. However, this raises the chip's operating temperature considerably, often causing early failure.

## Parts of the CPU

Processor circuitry is organized into separate logic elements — perhaps a dozen or more — called execution units. The execution units work in concert to implement the four operating stages. The capabilities of the execution units often overlap among the processing elements. The following are some of the common processor execution units:

- **Arithmetic logic unit (ALU):** Performs all arithmetic operations. Sometimes this unit is divided into subunits, one to handle all integer add and subtract instructions, and another for the computationally complex integer multiply and divide instructions.

- **Floating-point unit (FPU):** Deals with all floating-point (non-integer) operations. In earlier times, the FPU was an external coprocessor; today, it's integrated on-chip to speed up operations.

- **Load/store unit:** Manages the instructions that read or write to memory.

- **Memory-management unit (MMU):** Translates an application's addresses into physical memory addresses. This allows an operating system to map an application's code and data in different virtual address spaces, which lets the MMU offer memory-protection services.

- **Branch processing unit (BPU):** Predicts the outcome of a branch instruction, aiming to

reduce disruptions in the flow of instructions and data into the processor when an execution thread jumps to a new memory location, typically as the outcome of a comparison operation or the end of a loop.

- **Vector processing unit (VPU):** Handles vector-based, single-instruction multiple data (SIMD) instructions that accelerate graphics operations. Such vector-based instructions include Intel Corp.'s multimedia extensions and Streaming SIMD Extensions, 3DNow from Sunnyvale, Calif.-based Advanced Micro Devices Inc. and AltiVec from Schaumburg, Ill.-based Motorola Inc. In some cases, there's no discrete VPU section; Intel and AMD incorporate those functions into the FPU of their Pentium 4 and Athlon CPUs.

Not all CPU elements execute instructions. Considerable effort goes into ensuring that the processor gets its instructions and data as fast as possible. A fetch operation that accesses main memory (i.e.,

somewhere not on the CPU chip itself) will use many clock cycles while the processor does nothing (stalls). However, the BPU can do only so much, and eventually, more code or instructions must be fetched.

Another way to minimize stalls is to store frequently accessed code and data in an on-chip cache [Technology Quick Study, April 2, 2000]. The CPU can access code or data in the cache in one clock cycle. The primary on-chip cache (called Level 1, or L1) is typically only about 32KB and can hold only part of a program or data. The trick to cache design is finding an algorithm that gets key information into L1 cache when it's needed. This is so important to performance that more than half of a processor's transistors may be used for a large on-chip cache.

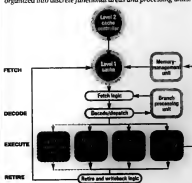
However, multitasking operating systems and a bevy of concurrent applications can overwhelm even a well-designed L1 cache. To address this problem, vendors several years ago added a high-speed dedicated bus interface that the processor could use to access a secondary Level 2 cache (L2) at a very high speed, typically half or one-third of the processor's clock rate. Today's newest processors, the Pentium 4 and PowerPC 7445, go further and place the L2 cache on the CPU chip itself, providing high-speed support for a tertiary Level 3 external cache. In the future, chip vendors may even integrate an on-CPU memory controller to speed things up even more. ■

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## Silicon Structure

CPUs encompass millions of individual elements, but they're organized into discrete functional areas and processing units:





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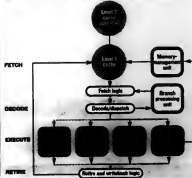
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POWER-UP CRASH  
FORM CONNECT BACK-UP  
SHUT DOWN MOVE  
PULL PLUG



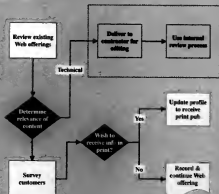
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Add storage and content without adding more racks. With help from DataCore. Our SANsymphony™ software virtualizes storage, creating shared pools from any networked assets. So you can use storage from one server to alleviate the growing pains of another. For more on virtualization, read our free white paper at [www.datacore.com/click](http://www.datacore.com/click). After all, the best way to solve your storage problem is to keep it from ever becoming one.

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## See what I'm saying?



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Microsoft

# Security Manager Explains How Not to Get a Job

Poorly prepared applicants — and hackers posing as candidates — bog down the hiring process

BY VINCE TURNER

I'VE ALWAYS BEEN lucky when it comes to staffing. I employ people I'm very happy with, and despite high turnover within the industry, I've always managed to retain key people. There are many reasons for this, but hopefully, one of them is because I treat them well and let them develop professionally.

However, although I've been lucky and able to keep turnover down, from time to time, we take on small projects that require temporary staff — and that exposes me to the horror of recruiting. I hate it. All those résumés. All those phone calls. All the time wasted in interviews.

Don't get me wrong: I enjoy a good interview. It's just that so few interviews are even barely possible, despite my best efforts to put candidates at ease and get the best from them.

I was looking for someone to improve the security awareness of my company, prepare awareness materials and present them to employees. Because written and oral presentation is vital to the role, I was looking for a résumé that summarized the candidate's experience in a readable format. I also was hoping for a well-presented interview, with swift rapport. Formal qualifications weren't vital, but the breadth of experience represented by a Certified Information Systems Security Professional qualification would certainly be welcome.

## Hiring Hell

The problems started with the résumés. A concise and relevant listing of experience is useful, but a three-page list of every bit of software and hardware a person has ever used doesn't impress me. "Oooh — here's the one we must hire. I use Microsoft Word 2.0!" isn't a phrase I say every often.

And the hardware experience listed was even weirder: "386, 486 and Pentium processors" is a depressingly common line in this section. Did these people take part in the design process? Did they write tailored code for these chips? It turns out, no. What they mean to say is, "I ran Windows on a range of processors." I delight in asking detailed questions about Intel's MMX CPU extensions and the like until the candidate is forced to admit what he really meant.

In an interview, I always ask the names of the last three books the candidate read. Few of those who have listed reading as an interest on their résumé can even name three books. My advice to candidates: If you want a job, remove this section.

These problems aren't very security-focused, but neither was the candidate who wrote, "I can drive a tractor" under "Other Skills and Qualifications." And another tip: Yes, the Microsoft Word résumé wizard looks very original to you,

but it won't stand out on my desk when it's the 500th I've seen in that format.

If the candidate miraculously passes the résumé phase, I interview him briefly over the phone. This isn't standard practice, but I find it helps filter out the wildly inappropriate candidates. Another hint: Don't take these calls with your mother in the background or on a mobile phone on a bus. I've had candidates do this and, oddly enough, they weren't called in for further interviews.

The final hurdle is an interview at my company's office. Some ringers still manage to slip through to this stage. Making up a complete pack of lies on your résumé and then trying to brag your way through the interview isn't going to get you the job, and once I tell your recruiting agent and my friends in

the industry, you won't be getting a lot of other jobs either. I talk with other security managers and pass on good candidates, and I recommend that other security managers do the same.

## The Trojan Horse Candidate

Security managers, be forewarned: I've met some charming job candidates whose motivation for interviewing appeared to be to find out about our financial systems so they could hack into them later. They had no background experience and no interest in the salary, long-term prospects, career progression or holidays. They did pay special attention to what operating systems and protective measures we ran. They were generally shifty and evasive. Any of these characteristics on their own could have been innocent enough or the product of interview nerves, but the combination made us overwhelmingly suspicious.

My strangest interview, however, was with an applicant who had a few cryptography skills on his résumé but was mostly business-focused. We were looking for someone to write a cryptography library, so he looked like a pretty reasonable fit. The interview was going well until about 30 minutes in, when he asked why we were asking only about his cryptography "hobby" and not his work skills. We were even more surprised when he explained he was applying for a securities management position, rather than the information security management role we had to offer.

I now take a little more care to check with the recruiting agent or candidate before we have an interview.

Despite all of these trials, we did manage to find the right candidate. The recruiting agent infected his résumé with a virus before sending it to us. This helped the résumé stand out from the crowd, but not in a good way.

Now that he works for us, we've found out the truth behind the agency's claim that it interviews all candidates before sending them to us. Technically, it was true, but a five-minute chat in a coffee shop before sending a candidate to the wrong office doesn't exactly meet our expectation that the agency has carried out an in-depth background check and skills evaluation. ■

## SECURITY SURVEY

When Chris Pick and Todd Tucker want to demonstrate to a client how vulnerable its system is, they often just opt on a pair of overalls and pick up a tool box.

"Social engineering" your way into a building is one of the easiest means of breaking into a company's computer system, says Pick, vice president of product strategy at PenTestSecurity Technologies Inc. in Houston.

"We would show up 7:30 Monday morning in coveralls, with a tool satchel and a whiteboard," Pick says. "We'd tell the receptionist we were there to hang the whiteboard in the conference room. We looked like we were the right people to do that job."

Then, Pick says, he would set up a laptop, plug into the system and walk away with "the keys to the kingdom."

Measuring and auditing security of individual companies for a part of what lines up PenTestSecurity in business. But the company plans to embark on a much larger audit in the coming weeks, and this one is free, too.

PenTestSecurity is conducting a survey of companies around the world. It will ask security officers a series of questions about how they view security at their firms. Then the survey will ask employees at those companies the same questions.

PenTestSecurity will compare the results to give security officers a better idea of their companies' security readiness and posture.

What makes this survey different, Tucker says, is that it's free, and any information gathered about the participants will remain confidential and won't be shared with PenTestSecurity's sales or marketing teams.

In other words, Tucker says, no one is going to contact you.

Anyone is allowed to take part in the PenTestSecurity survey. All you have to do is go to PenTestSecurity's survey page ([www.humanintelligence.org/secure/survey.asp](http://www.humanintelligence.org/secure/survey.asp)) within the next few weeks, request a password and log in.

The results of the survey will be published on the Computerworld Security Community site and on PenTestSecurity's site. For further information, contact the company at [www.pen-testsecurity.com](mailto:www.pen-testsecurity.com).

— Brian Sullivan



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# Start-up Does Supply Chains by the Book

Trigo's hosted supply-side software facilitates catalog creation, management

BY AMY HELEN JOHNSON

**W**HEN OFFICE products retailer Staples Inc. began offering catalogs and customer ordering via the Web, one thing became clear, says Laura Brooks, manager of site design and operations for the company's Web channel: The existing content-management system was woefully inadequate. Despite the best efforts of the IT team, producing content was slow and inefficient, resulting in wasted time, missed deadlines and poor quality.

By February, however, the Framingham, Mass.-based firm had switched to new online channel-management software developed and hosted by Brisbane, Calif.-based Trigo Technologies Inc. that's designed for suppliers.

Trigo's software has enabled Staples to build a content-management team out of merchandisers, marketing staff and business analysts — the product experts — instead of the IT experts, Brooks says. It also let the company develop a process for more easily producing custom catalogs for individual clients and for the online exchanges from which many Staples customers purchase office supplies.

## Building Its Business

Before using Trigo, Staples sold only 8,000 products online, and all of the content went to one catalog that was available at [www.stapleslink.com](http://www.stapleslink.com), explains Brooks. The number of products online has since increased by a factor of 10, she says, and Staples regularly builds catalogs for individual customers and exchanges as well.

The ability to easily produce sales material for exchanges is a key advantage, claims Trigo CEO Tom Reilly. Customers can buy the software directly or use Trigo's hosted service. The company aims its offerings at large manufacturing and distribution enterprises with sales

of \$1 billion or more in areas such as indirect goods, office products, factory goods and finished technology products.

Trigo requires only a browser on the client, but the user must build a master catalog on the back end that contains all product information. Building individualized catalogs means specifying which information from the master catalog to include in the custom catalog, adding any customer-specific

contract details and targeting a specific output format, says Reilly.

Trigo helps suppliers handle formats necessary to sell through online sales systems from Commerce One Inc., Ariab Inc., Oracle Corp., 12 Technologies Inc. and MRO Software Inc. It also includes tools to build links to other exchange protocols and to private exchanges and other online catalog formats.

Staples looked at products from Trigo, Post Software Corp., Vignette Corp. and Blue Martini Software Inc., says Brooks. Among the several factors that pushed Trigo to the forefront, she says, was the vendor's willingness to support her company's legacy content repository, which was built in-house.

Another reason why Staples picked Trigo's software is that it's highly adaptable, says Brooks. Trigo can handle the proprietary information Staples sometimes needs to include in catalogs for its business-to-business customers. For example, Trigo's application allows customers to create their own product descriptions and SKU numbers, she explains. Staples also sells custom goods such as end-of-aisle retail displays and restaurant menus, and Trigo can

handle these exceptions to the master catalog, says Brooks. For the most part, Trigo is easy to use, says Brooks. However, she says she'd like to see improvements to the user interface for the tools that generate custom catalogs.

In Version 3.0, scheduled for release this month, Trigo plans to use usability improvements, along with upgrades to the product's workflow and business-process modeling tools, says Reilly. In the long term, he says, he plans to round out Trigo's sales and fulfillment features. Right now, the product only encompasses online catalog production and order acceptance. ■

Johnson is a Computerworld contributing writer in Seattle.

the buzz

STATE OF THE MARKET

## Booming Niche In Just Times

Trigo has two advantages in a tough IT market: a fresh infusion of venture capital and a hot growth market into which to sell. Projections by Framingham, Mass.-based market research firm IDC show supply chain services increasing from \$23.1 billion worldwide last year to \$42.2 billion in 2005, with a compound annual growth rate of 29%.

Like Trigo, the companies that supply tools to manage channels and exchanges are very young, says Andrew Bartels, an analyst at Cambridge, Mass.-based Giga Information Group Inc.

Since the technology is so new, Bartels says, no single vendor has a distinct advantage over the others. To differentiate themselves, most vendors focus on particular industries or companies at specific points in the supply chain. Trigo focuses on retailers of indirect goods in the middle of the supply chain, says Bartels.

What isn't unique about Trigo, Bartels says, is its ability to help suppliers connect with exchanges. Most software vendors have at least some features for doing that.

## Comergent Technologies Inc.

Redwood City, Calif.

[www.comergent.com](http://www.comergent.com)

Comergent offers a channel management system for companies that sell through resellers, says Bartels, and it has expertise in high-tech products. The online channel Comergent serves differs from Trigo's in that it requires more support for order handoffs to resellers, as well as tools for product configuration, he says.

## Inroads Technologies Inc.

Phoenix, Calif.

[www.inroads.com](http://www.inroads.com)

Inroads offers tight integration between its business-to-business e-commerce software and midmarket back-end systems from J.D. Edwards & Co., Manacm Solutions Inc., SSA Global Technologies Inc. and SAP AG, making it a good choice for organizations that use those applications.

—Amy Helen Johnson



TRIGO'S ABILITY to produce sales material for exchanges is key, says CEO Tom Reilly (center), with Byron Deiter (left) and Ryan McPherson.

## Trigo Technologies Inc.

8000 Marina Blvd., Suite 810  
Brisbane, Calif. 94005  
(850) 827-0500

Web: [www.trigo.com](http://www.trigo.com)

**The technology:** Catalog management software for online indirect goods sellers

### Company officers:

- Tom Reilly, CEO
- Byron Deiter, co-founder and vice president of business development
- Ryan McPherson, co-founder and chief technology officer
- Verity Gerasian, co-founder and vice president of product marketing

### Milestones:

- January 2001: Raised \$10 million in first-round funding
- February 2001: Released first product

- August 2001: Raised \$14 million in second-round funding
- Employees: 55

**Burn money:** \$24 million from Mayfield Fund, The Venture Group LLC and others

**Products/pricing:** Trigo Enterprise software: \$500,000 to \$750,000; hosted version, \$25,000 to \$50,000 per month

**Customers:** Staples, Moore North America (a unit of Moore Corp.) and Corporate Express Inc.

### Red flags for IT:

- Trigo's experience is mainly in the indirect goods niche.
- The service only handles the catalog production and order acceptance stages of the online sales process.



Address: 24 Boston















FRANK HAYES/FRANKLY SPEAKING

## IT vs. Terrorism

**I**T'S NOT A DUMB IDEA — it just looks that way on the surface. The notion of re-creating the federal government's Y2k command center, only this time in order to make sure critical infrastructure is protected against terrorist attacks instead of programming problems, sure does seem misconceived.

Y2k was a one-time problem; terrorism is an ongoing risk. Y2k had straightforward, if very expensive, fixes; terrorism is largely undefined. Y2k threatened computer systems; terrorism threatens everything. In almost every way, Y2k is the wrong model. Terrorism simply isn't Y2k.

But a Y2k-style effort is the right idea anyhow — and not just for the feds.

After all, the biggest threat from the millennium bug wasn't the chance that computers might fail on Jan. 1, 2000. It was the possibility that ripple effects could cascade faster than any recovery effort could hope to match.

If a critical computer system failure knocked out part of the electric grid, and that triggered a failure in the telephone system, which in turn disabled control systems that handled water or natural gas or air traffic control — that was the kind of problem we all dreaded.

It didn't happen with Y2k. But that's exactly the kind of ripple effect terrorists would aim for when they attack.

It also makes sense that it's the IT-focused electric utilities that are floating the idea of the old Y2k command center being reborn as an infrastructure security effort. They already use IT heavily to monitor transmission systems — which are already threatened by thieves and vandals as well as earthquakes, hurricanes, floods and blizzards.

And their standards for reliability are pretty much the old glass-house standards: The system isn't allowed to stop working because of a glitch or a bug. Unplanned downtime for anything less than a disaster is unacceptable — and even then there should be fail-over systems to minimize recovery time.

That's how you protect infrastructure: by making it as secure as possible, then constantly monitoring for problems, reacting as soon as they're detected and always having a way of keeping things running, even when something fails.

It's that IT mind-set that makes a

command center approach a perfect match for infrastructure protection.

And that's a very good reason for corporate IT shops to be floating the idea of an infrastructure protection command center for our own companies, too.

Not just a corporate security department — we've already got that, complete with rent-a-cops and ID badges and alarm systems. The security department will be part of the infrastructure protection command center and may even provide its home.

But current physical security will need to be beefed up in the days to come — not just with more guards, but with better tools to monitor who's where they're not supposed to be or doing things they're not supposed to be doing. That will require IT.

Protecting the business will also require guarding against supply chain disruption. And fighting cybersabotage. And implementing disaster recovery. Those things are on the IT shop's agenda already.

Most important, infrastructure protection will require the ruthless thoroughness IT shops already know from Y2k projects — finding every problem and fixing it — and the cross-departmental cooperation that made that thoroughness possible.

No, a corporate infrastructure protection command center won't be our baby. But we'll be involved in it up to our necks.

Which means that now is the time for IT to propose it to corporate management. Otherwise, we'll be brought in late in the game, under someone else's control and with the best lessons from our Y2k experience wasted.

And that really would be dumb. ■



FRANK HAYES, Computerworld's senior news columnist, has covered IT for more than 20 years. Contact him at [frank\\_hayes@computerworld.com](mailto:frank_hayes@computerworld.com).

## SHARK TANK

**MONTECHIE** IT director, hired for his "big picture" skills, tells syndromist pilot fish he wants to be made the administrator on the company's systems — and he's adamant. "So I change his low-access user name," says fish. "To Administrator."

**RASH OF VIRUSES** spurs companywide installation of a product called ServerProtect.

One LAN admin calls high-level support pilot fish because the installation screen he's seeing don't match the step-by-step instructions for the program. "Are you in front of the server now?" fish asks. Replies admin, "Are we supposed to be installing this on the server?"

**DOING A server update**, pilot fish and his team shut down all computers suddenly. Work done, he tells all at users that "they can bring their computers up now," says fish. Ten minutes later, one user shows up at his door with computer in hand and asks us where we want it.

**DEPARTMENT STORE** IT pilot fish hates the prospect of leading all that network cable from one end of the store to the other. But in the toy department, he gets an idea. "We get a bow and arrow, tie a string to the arrow and shoot it to the other end of the store above the ceiling tiles," he says. "Then use the string to pull the cable."

**AFTER GIVING** a daylong seminar on cybercrime, consultant pilot fish is approached by one client who thinks he has the answer to foiling attacks: Use dynamic IP addresses for Web servers so hackers can't find them. That could work, says fish gently. "But don't you think customers also being unable to find the Web site would be considered a problem?"

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## The 5th Wave



"It's called 'Lunar Pukes.' Everyone gets to see everyone else's cards, everything's wild, you can play off your opponent's hands, and everyone wins except Phil Gates, whose face appears on the Jokers."

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